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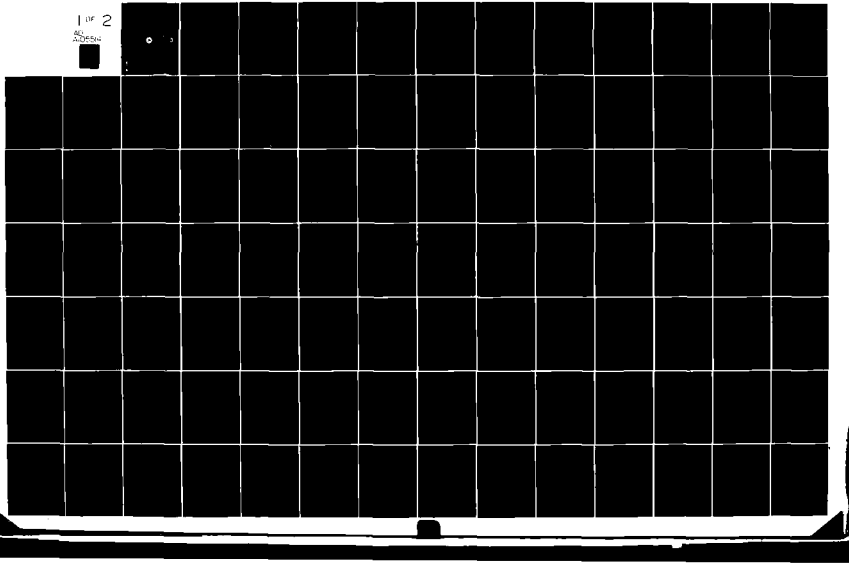

Report No. FAA-CT-81-50-2

LEVEL I

A105393

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MLS PERFORMANCE ASSESSMENT
TASK IV
VOLUME 2: LITERATURE SEARCH ABSTRACTS

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FINAL REPORT

DECEMBER 1980

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TECHNICAL CENTER
Atlantic City Airport, N.J. 08405

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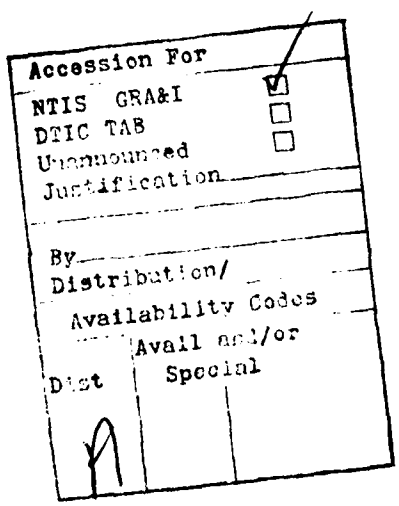

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15. Supplementary Notes

16. Abstract

A collection of available Microwave Landing System (MLS) literature is presented, as a result of searches conducted by computer through files of the National Technical Information Service, (NTIS), the Engineering Index(TM), and the INSPEC database, produced by IEE.

17. Key Words	18. Distribution Statement
Microwave Landing System, MLS, STEP Program, standards, tolerances, flight-check, position reference, light-aircraft, navaid flight check, digital telemetry, theodolite	This document is available to the U.S. public through the National Technical Information Service, Springfield, Virginia 22161

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TABLE OF CONTENTS

I. INTRODUCTION

In support of the design effort to produce data-collection and recording hardware and flight procedures for measurement of Microwave Landing System (MLS) parameters under the FAA System Test and Evaluation Program (STEP), a computer literature search has been conducted and is reported here. The abstracts presented are the result of searches conducted on the files of the National Technical Information Service, the Engineering Index (TM) and the INSPEC database, produced by IEE. These abstracts have been collected as a guide to project team members during the design effort, and for reference in future work.

II. MICROWAVE LANDING SYSTEM LITERATURE ABSTRACTS

A. NTIS Files.

Parallel Approach Surveillance

Massachusetts Inst of Tech Lexington Lincoln Lab (207650)
AUTHOR: Allen, J. B.; Denlinger, E. J.
A5105L3 Fld: 17G, 1B, 51F GRAI7220
14 Aug 72 55p
Rept No: ATC-13
Contract: DOT-FA72WAI-261, F19628-70-C-0230
Project: FAA-034-241-012
Monitor: FAA-RD-72-77
Report on Project 'Discreet Address Beacon System.'

Abstract: The report investigates the requirements imposed on a surveillance system for supporting independent approaches to closely spaced parallel runways. Based on a proposed procedure for monitoring aircraft approach paths and controlling deviations from proper approach paths, the required spacing between runway centerlines is derived as a function of surveillance system characteristics and other parameters. Potential trade-offs between the surveillance system characteristics are then investigated to determine whether the DABS sensor might be utilized for position measurement and/or communication in such a surveillance system. The results indicate that the required runway spacing is more sensitive to delays and data update intervals than to position measurement accuracies, and that, if DABS is to perform the communication function in the system, it should probably be used for position measurement as well. (Author)

Descriptors: (*Radar landing control, *Data transmission systems), (*Aircraft landings, Approach), Ground-controlled approach radar, Sensors, Pilots, Performance(Human), Microwave equipment, Turning flight, Numerical analysis

Identifiers: DABS(Discrete Address Beacon System), Discrete address beacon system

AD-747 744 NTIS Prices: PC A04/MF A01

Mls System Dme Power Amplifier . Systeme M.L.S. D.M.E. Chaine de Puissance

Laboratoire Central de Recherches Thomson-csf, Orsay (France).
AUTHOR: Amblard, Y.; Bonnier, J. J.; Ermoglio, R.
C1211A4 Fld: 1D STAR1113
28 Aug 72 17p
Monitor: 18
Language French

Abstract: An airborne C-band pulse transmitter was developed for use with an ILS system. Transmitter characteristics include a transmitting frequency of 5067 to 5124 MHz, frequency number of 20 spaced 3 MHz, 1 second switching time, 0.00002 stability, and a 2 kW maximum power, 205 mW average power, 0.66enl microsec pulse width, 40 Hz repetetion frequency, and a 2 spaced between 10 and 30 microsec pulse number. (Author)

Descriptors: *Airborne equipment, *Instrument landing systems, *Transmitters, C band, Pulsed radiation

Identifiers: NASA

N73-22086 NTIS Prices: PC A02/MF A01

Microwave Landing System Integration Study. Volume III. Appendices

Air Force Inst of Tech Wright-Patterson AFB Ohio School of Engineering (012225)

Final rept. 25 Jun 73-4 Mar 74
AUTHOR: Andrews, Edward Jr; Arnold, John E.; Brittain, Charles R.; Cooke, Garth R.; Curran, William M.
C2583G1 Fld: 17G, 85A GRAI7410
4 Mar 74 253p
Rept No: GSE/SE/74-1-Vol-3
Project: AF-404L
Monitor: 18
See also Volume 2, AD-775 711.

Abstract: Contains computer programs and data in support of the study.

Descriptors: *Landing aids, Microwave equipment, Computer programs, Aircraft antennas, Microwave antennas, Signal processing, Costs, Life cycles, Cost analysis, Avionics, Jet transport planes, Jet fighters, Fighter bombers, Systems engineering

Identifiers: *Microwave landing systems, C-130 aircraft, C-130E aircraft, C-5 aircraft, C-5A aircraft, F-15 aircraft, F-111 aircraft, FB-111A aircraft, AF

AD-775 724/8 NTIS Prices: PC E09/MF A01

Microwave Landing System Integration Study. Volume I. Summary Report

Air Force Inst of Tech Wright-Patterson AFB Ohio School of Engineering (012225)

Final rept. 25 Jun 73-4 Mar 74
AUTHOR: Andrews, Edward Jr; Arnold, John E.; Brittain, Charles R.; Cooke, Garth R.; Curran, William M.
C2583A4 Fld: 17G, 85A GRAI7410
4 Mar 74 85p
Rept No: GSE/SE/74-1-Vol-1
Project: AF-404L
Monitor: 18
See also Volume 2, AD-775 711.

Abstract: The integration of the Microwave Landing System (MLS) into a representative selection of United States Air Force aircraft is investigated to identify problems affecting Air Force requirements for MLS. Antenna configurations and signal processing and interface designs are developed for the C-130E, C-5A, FB-111A, and F-15. These configurations and designs provide data for the environmental, cost, and systems effectiveness analyses presented in this report. A comparative analysis of different approach capabilities is carried out, using the C-130E as an illustration. These capabilities include straight, curved, and stepped approach paths as well as approaches into forward operating bases. (Modified author abstract)

Descriptors: *Landing aids, Microwave equipment, Microwave antennas, Aircraft antennas, Signal processing, Avionics, Costs, Life cycles, Cost analysis, Jet transport planes, Jet fighters, Fighter bombers, Systems engineering

Identifiers: *Microwave landing systems, C-130 aircraft, C-5 aircraft, FB-111A aircraft, F-15 aircraft, F-111 aircraft, C-130E aircraft, C-5A aircraft, AF

AD-775 703/2 NTIS Prices: PC E04/MF A01

Microwave Landing System Integration Study. Volume II. Engineering and Cost Analysis Report

Air Force Inst of Tech Wright-Patterson AFB Ohio School of Engineering (012225)

Final rept. 25 Jun 73-4 Mar 74
AUTHOR: Andrews, Edward Jr; Arnold, John E.; Brittain, Charles R.; Cooke, Garth R.; Curran, William M.
C2583C4 Fld: 17G, 85A GRAI7410
4 Mar 74 268p
Rept No: GSE/SE/74-1-Vol-2
Project: AF-404L
Monitor: 18
See also Volume 1, AD-775 703 and Volume 3, AD-775 724.

Abstract: The integration of the MLS into the avionics subsystems of selected Air Force aircraft was investigated in this study. Antenna configurations and signal processing and interface designs were developed. These designs were the basis for avionics environment, cost, and system effectiveness analysis of the retrofit of MLS into the C-130E, C-5A, FB-111A, and the F-15. The C-130E study was used for the comparative analysis of different approach capabilities and MLS configurations.

Descriptors: *Landing aids, Microwave equipment, Microwave antennas, Antennas, Aircraft antennas, Signal processing, Avionics, Costs, Life cycles, Cost analysis, Jet transport planes, Jet fighters, Fighter bombers, Systems engineering

Identifiers: *Microwave landing systems, C-130 aircraft, C-130E aircraft, C-5 aircraft, C-5A aircraft, F-111 aircraft, FB-111A aircraft, A

AD-775 711/5 NTIS Prices: PC E09/MF A01

Air Force Avionics Standardization: an Assessment of System/Subsystem Standardization Opportunities

Arinc Research Corp Annapolis Md (400247)

Final rept.
AUTHOR: Baily, S.; Martinec, D. A.; Savisaar, A.; Sullivan, N.
E1282C4 Fld: 15E, 17G, 17B, 9C, 1C, 51E, 74E GRAI7814
Mar 78 67p
Rept No: 1910-13-2-1722
Contract: F09603-76-A-3231
Monitor: 18

Abstract: The following specific contractual tasks were defined for ARINC Research by Aeronautical Systems Division avionics planning directorate ASD/XRE: Task I: Provide Engineering Support in Preparation for Future INS Procurement Activities -- Perform the analyses and trade-off studies to support the Air Force INS Single Agency in the preparation of the RFP and source selection tools for use on the initial standard INS procurement. (This effort was limited to support during the RFP preparation phase only). Task II: Provide Engineering Support in Analyzing New Opportunities for Specification Development -- Investigate and analyze Air Force avionics requirements to determine the patterns, the extent of force applications, and the commonality of force needs. Organize data by class of equipment, quantities, timeframe, application, and other pertinent market survey parameters. Develop criteria for weighing standardization opportunities and ranking opportunities as they are identified. Task III: Provide Engineering Support to Develop, Refine, and Update Avionics Planning Baseline Document -- Perform the Analyses and data collection necessary to develop, refine, and update the Avionics Planning Baseline document.

Descriptors: *Standardization, *Avionics, Systems engineering, Inertial navigation, Terminals, Target acquisition, Command and control systems, Position finding, Interfaces, Feasibility studies, Microwave landing systems, Navigation satellites, Mission profiles

Identifiers: Weighting, Ranking, NTISDODXA

AD-A052 235/9ST NTIS Prices PC A04/MF A01

Aircraft Antenna Analysis and Microwave Landing System (MLS) Applications

West Virginia Univ Morgantown Dept of Electrical Engineering (410279)

Final rept. 1 Jan 74-31 Dec 75
AUTHOR: Balanis, Constantine A.; Cheng, Yuk-Bun
D3015K3 Fld: 18, 9F, 17G, 51B, 49A, 76C GRAI7719
31 Jan 76 223p
Contract: DOT-OS-40013
Monitor: FAA-RD-76-37

Abstract: The purpose of this investigation was to develop analytical methods for predicting the radiation characteristics of antennas on aircraft. Diffraction techniques in conjunction with other classical electromagnetic methods were used to take into account contributions from various structural features of an airframe (tail, nose, wings, and main fuselage). Computed values were compared with measured data of antennas on scaled model aircraft such as 1/35 scale space shuttle, 1/11 scale Boeing 737, and 1/25 scale KC-135. A very good agreement between theory and experiment was indicated. With the availability and versatility of the analytical techniques, computations were made for antennas on full scale aircraft such as the Boeing 737, Boeing 747, and KC-135. The frequency of operation of the antennas on the full scale models was 5.1 GHz which is within the proposed band for the MLS. Of the antennas, locations, and aircraft examined in this investigation, a circumferential aperture, which is vertically polarized in the elevation plane, mounted below the nose (station 169) or above the cockpit (station 306) of a Boeing 747 provides the most attractive coverage for MLS application. A vertical monopole also demonstrates good coverage, but it is not as attractive as that of the circumferential aperture. (Author)

Descriptors: *Microwave landing systems, *Aircraft antennas, Aviation safety, Diffraction, Airframes, Antenna radiation patterns, Antenna apertures, Scale models, Airplane models, Wedges, Coupling(Interaction), Two dimensional

Identifiers: NTISDODXA

AD-A041 484/7ST NTIS Prices: PC A10/MF A01

EXPERIMENTATION WITH FLARESCAN VERTICAL GUIDANCE LANDING SYSTEM

National Aviation Facilities Experimental Center Atlantic City N J (000000)

Final rept.
AUTHOR: Bencivenga, V.

1772E1 USGRDR6507
Nov 64 2p
Rept No: RD-64-150
Project: 114 012 00X

Abstract: Static and dynamic tests were conducted on Flarescan, a vertically scanned microwave guidance system, to determine its suitability for use in an all-weather landing system. Areas of investigation included lowangle coverage, position determining accuracy, siting effects, noise content, scan rate, scan direction, method of signal coding, type of antenna pattern, weather effects, interference susceptibility, optimum flight path characteristics, etc. (Author)

Descriptors: (*ALL-WEATHER AVIATION, INSTRUMENT LANDINGS), (*INSTRUMENT LANDINGS, GLIDE PATH SYSTEMS), (*GLIDE PATH SYSTEMS, MICROWAVE EQUIPMENT), (*AVIATION SAFETY, INSTRUMENT LANDINGS), APPROACH, FLIGHT PATHS, GUIDANCE, LANDING AIDS, SPECIAL PURPOSE COMPUTERS, FLIGHT TESTING, FEASIBILITY STUDIES, CIVIL AVIATION, RADIO SCANNING

Identifiers: FLARESCAN

AD-611 445 CFSTI Price: PC A02

EXPERIMENTATION WITH REGAL VERTICAL GUIDANCE LANDING SYSTEM

National Aviation Facilities Experimental Center Atlantic City N J (000000)

Final rept.
AUTHOR: Bencivenga, V.; Murphy, E. J.
1772D4 USGRDR6507
Nov 64 2p
Rept No: RD-64-149
Project: 114 009 00X

Abstract: Static and dynamic tests were conducted on REGAL (Range and Elevation Guidance for Approach and Landing), a vertically scanned microwave guidance system, to determine its suitability for use in an AllWeather Landing System. Areas of investigation included low-angle coverage, position determining accuracy, siting effects, noise content, scan rate, scan direction, method of signal coding, type of antenna pattern, weather effects, interference susceptibility, optimum flight path characteristics, etc. Aircraft using REGAL guidance information, coupled to various approach and flare couplers, were flown to touchdown using both manual and automatic control. Flight tests were conducted in a C-54G, Aerocommander, JC-131B and B-25 aircraft in both clear and adverse weather including rain, snow and fog with wind conditions varying from direct head winds to tail wind components of 20 to 25 knots. During the test program, more than 200 automatic landings were accomplished using various combinations of approach paths, flare paths and error signals. The results of these tests as well as design changes and future program requirements are discussed in this report. (Author)

Descriptors: (*ALL-WEATHER AVIATION, INSTRUMENT LANDINGS), (*INSTRUMENT LANDINGS, GLIDE PATH SYSTEMS), (*GLIDE PATH SYSTEMS, MICROWAVE EQUIPMENT), (*AVIATION SAFETY, INSTRUMENT LANDINGS), RANGES (DISTANCE), APPROACH, FLIGHT PATHS, GUIDANCE, LANDING AIDS, FLIGHT TESTING, FEASIBILITY STUDIES, CIVIL AVIATION, RADIO SCANNING

Identifiers: REGAL

AD-611 446 CFSTI Price: PC A02

Test and Evaluation of a Portable Scanning Beam Guidance System

National Aviation Facilities Experimental Center Atlantic City N J (240550)

Final rept. Oct 68-Jun 70
AUTHOR: Bencivenga, Vincent L.
A4001J3 Fld: 1E, 17B, 51E, 61C GRAI7209

Mar 72 137p*
Rept No: FAA-NA-72-26
Project: FAA-RD 074-319-03X, FAA RD-320-204 03X
Monitor: FAA-RD-72-16

Abstract: A portable scanning beam guidance system was installed and tested at 28 field locations. The sites selected were located at 16 different airports in the eastern United States and were known to be difficult instrument landing system (ILS) sites. The system was tested both as a glide slope and as a localizer. The system was installed, calibrated, and initially aligned without the need for extensive flight testing to verify system performance. Results are reported, largely in oscillogram form. (Author)

Descriptors: (*Landing aids, *Microwave equipment), (*All-weather aviation, Landing aids), Glide path systems, Civil aviation, Radio scanning, Terrain, Instrument landings, Programming(Computers), Portable, Reliability(Electronics)

Identifiers: Evaluation, Difficult instrument landing sites

AD-739 256 NTIS Prices: PC A07/MF A01

Test and Evaluation of an Advanced Integrated Landing System for All-Weather Landing

National Aviation Facilities Experimental Center Atlantic City N J (240550)

Final rept. Aug 65-Feb 70
AUTHOR: Bencivenga, Vincent L.
A122183 Fld: 17G, 51F USGRDR7101
Aug 70 148p*
Rept No: FAA-NA-70-26
Project: FAA-320-204-01X
Monitor: FAA-RD-70-28

Abstract: Test and evaluation of an Advanced Integrated Landing System (AILS) was conducted. The AILS is a microwave, scanning beam system and provides precision azimuth and elevation guidance signals to an aircraft. The system incorporates a distance measuring equipment (DME) function, as well as a radar function for providing precision approach radar (PAR) type monitoring of an approach. During the test program, AILS approaches were made in fixed-wing aircraft, both prop and jet, including short take-off and landing (STOL) aircraft. Based on evaluation of the data collected, it was determined that (1) the AILS is capable of providing air-derived space position information to the following accuracies: DME data to plus or minus 100 feet or 1 percent of distance, whichever is greater, azimuth angle data to plus or minus 0.05 deg 1 sigma, and elevation angle data to plus or minus 0.03 deg 1 sigma; (2) the system is not adversely affected by overflying aircraft, and taxiing aircraft and/or other vehicles only affect performance when stopped so that they effectively shadow a transmitting antenna; (3) some minor system deficiencies exist. Proposed corrective measures are discussed. (Author)

Descriptors: (*Landing aids, *All-weather aviation), (*Approach, Landing aids), Integrated systems, Performance(Engineering), Flight testing, Guidance, Microwave equipment, Azimuth, Radar scanning

Identifiers: AILS(Advanced Integrated Landing Systems), Advanced integrated landing systems, Evaluation

AD-714 442 NTIS Prices: PC A07/MF A01

Investigations of Microwave Landing System Conventional and Doppler Scanning Beam Techniques

Cornell Aeronautical Lab Inc Buffalo N Y (098300)

Final rept. Jun 71-Sep 72
AUTHOR: Beneke, J.; Wightman, C. W.; Becker, H. D.; Kassel, C. E.

C045313 Fld: 1B, 17G, 17B, 85A, 51F GRAI7307
Sep 72 182p
Rept No: CAL-AG-5011-B-1
Contract: DOT-FA71WA-2592
Monitor: FAA-RD-72-124

Abstract: The report summarizes the results of analytical and experimental investigations carried out in support of the Microwave Landing System (MLS) program of the Federal Aviation Administration. The experimental program consisted of a simulation of the MLS signals that would be received in an aircraft. The systems simulated included conventional scanning beams with frequency and pulse angle coding, step-scan beams with frequency and time interval coding and the doppler scan technique. Angle measurement errors were determined for a wide range of signal parameters. Errors were measured in the presence of a single multipath of variable characteristics. Conclusions were drawn concerning the capability of the several signal formats to meet criteria accuracy requirements. The need for special processing techniques to reduce the effects of multipath is discussed. (Author)

Descriptors: (*Doppler navigation, Microwave equipment), (*Terminal flight facilities, *Air traffic control systems), Multipath transmission, Instrument landings, Frequency modulation, Pulse code modulation, Distance-measuring equipment, Automatic gain control, Microwave equipment

Identifiers: Doppler scanning beam, MLS(Microwave Landing Systems), Microwave landing systems

AD-755 940 NTIS Prices: PC A09/MF A01

Multipath and Performance Tests of TRSB Receivers

Calspan Corp Buffalo N Y (407727)

Interim rept. 74 Mar 77
AUTHOR: Beneke, J.; Wightman, C. W.; Vallone, C. B.; Offt, A. M.
03112I1 Fld: 17G, 76D, 85A GRAI7720
Mar 77 210p
Rept No: CALSPAN-AG-5580-E-1
Contract: DOT-FA74WA-3445
Monitor: FAA-RD-77-66

Abstract: A landing system simulation program has been carried out in support of the Microwave Landing System (MLS) program of the Federal Aviation Administration. Both scanning beam and doppler scan techniques were simulated and several angle processors were tested with each technique. This report contains the results of extensive simulation evaluations on the time reference scanning beam (TRSB) system. The results of the doppler simulation tests are published in the Calspan Technical notes referenced in this report. A representative set of multipath parameters was selected and used to explore the dynamic characteristics of the TRSB technique. Tests were run to determine the multipath error magnitude as a function of separation angle, amplitude, scalloping frequency and different processor parameters. These tests were conducted on a TRSB simulator that uses a computer to control the multipath parameters for each scan. Typical multipath scenarios were programed that represented the signals an aircraft would receive when flying through a multipath interference region. Some of the multipath scenarios used in the ICAO AWOP evaluations were simulated. The receivers used in the ICAO flight test program were evaluated in the simulator. A breadboard processor was developed that operates as a dwell gate processor, similar to the flight test receivers, or as a single edge processor (SEP) to evaluate the flare system. A closed loop simulation, including aircraft and autopilot characteristics, MLS signals with dynamic multipath characteristics and the MLS processor, was used to determine the aircraft perturbations resulting from hangar multipath reflections.

Descriptors: *Microwave landing systems, Multipath transmission, Doppler systems, Performance(Engineering), Flight simulation, Test and evaluation, Breadboard models

Identifiers: *Time referenced scanning beams, NTISDODXA

AD-A041 891/3ST NTIS Prices: PC A10/MF A01

Time Reference Scanning Beam Multimode Digital Processor

Calspan Corp Buffalo N Y (407727)

Final rept. 1974-Apr 78
AUTHOR: Beneke, J.; Wightman, C. W.; Vallone, C. B.; Offt, A. M.
E2545G3 Fld: 17G, 9B, 85A, 49B GRAI7824
Apr 78 74p
Rept No: CALSPAN-AG-5580-E-2
Contract: DOT-FA74WA-3445
Monitor: FAA-RD-78-84

Abstract: Landing system simulations have been carried out in support of the Microwave Landing System (MLS) program of the Federal Aviation Administration. The results of these simulations have been published in an interim report and in Calspan Technical Notes. This report contains the results of extensive simulation evaluations of a multimode digital processor developed for the time reference scanning beam (TRSB) system. Four processing algorithms were developed for the TRSB system. Simulation tests showed that the algorithms developed for the dwell gate processor were less sensitive to multipath errors and had less processing noise than the flight test phase 3 receivers. The split gate processor had smaller multipath and noise errors than the dwell gate processor. Two asymmetrical processing algorithms were implemented that had multipath errors of less than half the magnitude of the dwell gate or split gate techniques. The single edge processor (SEP) is effective for reducing elevation multipath errors from hangar reflections and ground reflections in flare data. An adaptive SEP was developed that can be used for azimuth or elevation data and is effective in reducing errors from multipath that occurs on either edge of the beam. The algorithms for the four process modes were implemented in an LSI-11 microprocessor packaged for convenient field and flight tests.

Descriptors: *Microwave landing systems, *Microwave receivers, *Microcomputers, Signal processing, Computerized simulation, Analog to digital converters, Algorithms, Multipath transmission, C band

Identifiers: PDP-11 computers, LSI-11 computers, TRSB system, SEP(Single Edge Processors), Single edge processors, NTISDODXA, NTISDOTFAA

AD-A058 083/7ST NTIS Prices: PC A04/MF A01

A Method for Mechanical Frequency Allotment for Radio Communication within the Icao European Region Metod Foer Maskinell Frekvenstilldelning Foer Radiokommunikation Inom Icao Europaregion

Research Inst. of National Defence, Stockholm (Sweden).
AUTHOR: Bergman, L.
C2405I1 Fld: 17B, 61C, 45C STAR1204
Dec 71 53p
Rept No: FOA-3-A-3753-E2
Monitor: 18

Abstract: Three aids for alloting frequencies within the communication band 118 to 136 MHz are considered, namely: A map drawing program, the matrix method and the allotment program. Programs for preparing separation and allotment matrices for the matrix method and also for the allotment program are described. (Author)

Descriptors: *Computer programming, *Computer techniques, *Frequency assignment, *Radio communication, Automatic frequency control, Europe, Information management, Matrices (Mathematics)

Identifiers: NASA

N74-12861/2 NTIS Prices: PC E02/MF A01

Systems Integration: RNAV and the Upgraded Third Generation System

Champlain Technology Industries Palo Alto CA*Federal Aviation Administration, Washington, DC. Systems Research and Development Service (410102)

Final rept. Jul 75-Dec 76
AUTHOR: Bolz, E. H.; Scott, R. W.; Stephensen, A. R.; Heine, W.
F2024F1 Fld: 17G, 85A GRAI7923
Dec 76 225p
Contract: DOT-FA72WA-3098
Monitor: FAA-RD-77-22

Abstract: This document presents the results of an analysis of the features of the Upgraded Third Generation ATC System in a program of evaluation of the impact of the implementation of Area Navigation on the other features of the UG3RD System. This analysis includes evaluations of the impact of RNAV on the performance and costs of these UG3RD features and, in turn, their impact on the performance, costs and benefits attendant to the implementation of RNAV. As a part of this study of UG3RD System has been examined from the systems integration point of view. One result of the study is the establishment of the effects which RNAV could have on UG3RD feature implementation schedule tradeoffs and interactions. These judgements were based upon a study of the problems of the existing ATC system, and the capabilities of each UG3RD feature, including RNAV, for solving each of these problems. Overall RNAV implementation costs and benefits (airline, general aviation, ATC system and airline passenger) are projected annually to the year 2000. These annual figures have been discounted to present value totals (1976), according to guidelines issued by the Office of Management and Budget, and the resulting benefit/cost ratios of RNAV are presented herein.

Descriptors: *Air traffic control systems, *Economic analysis, Microwave landing systems, Discrete address beacon systems, Commercial aviation, Cost effectiveness, Aviation safety, Performance(Engineering), Avionics, Air traffic controllers, Work measurement, Forecasting

Identifiers: NTISDODXA, NTISDOTFAA

AD-A070 775/2ST NTIS Prices: PC A10/MF A01

A Joint Army/Air Force Investigation of Reflection Coefficients at C and Ku Bands for Vertical, Horizontal and Circular System Polarizations

IIT Research Inst Chicago Ill (175350)

Final rept. Nov 75-Feb 76
AUTHOR: Brindley, A. E.; Calhoun, L. C.; Patton, T. N.
D0123B3 Fld: 20N, 17I, 1D, 17G, 85A, 63H, 46H, 76D GRAI 7701
Jul 76 160p
Contract: F33615-76-C-3044
Project: AF-404L0124
Monitor: AFFDL-TR-76-67

Abstract: This report describes an experimental effort to measure the reflection coefficients of typical airport structures at C-Band (5000 MHz) and Ku Band (15,000 MHz) for vertical (VP), horizontal (HP), and circular (CP) system polarizations. The choice of polarization is of vital concern in the implementation of microwave landing systems since it offers the designer an opportunity to minimize multipath reflections - the most critical factor limiting system performance. The measurements were made on buildings along the flight lines of Areas B and C at Wright-Patterson AFB, Ohio. It is shown for sixteen different combinations of frequency, grazing angle and reflecting surface that vertical polarization produced more severe specular reflections than either horizontal or circular radiation in every case. The HP measurements showed an advantage of at least 3 db over VP for 81% of the cases and in 88% of the cases the CP exhibited a similar advantage over VP.

Descriptors: *Radar reflections, *Microwave landing systems, *Multipath transmission, Reflectivity, C Band, Vertical orientation, Horizontal orientation, Circular, Polarization, Ku band, Joint military activities, Coefficients, Fresnel zone, Ground level, Illumination, Grazing, Angles, Multiple operation, *Airports, *Buildings, *Bistatic radar*

Identifiers: Reflection coefficients, NTISDODXA

AD-A031 403/9ST NTIS Prices: PC A08/MF A01

Analysis, Test and Evaluation Support to the USAF Advanced Landing System Program. Volume I. Program Description and Results

IIT Research Inst Chicago Ill*Air Force Flight Dynamics Lab., Wright-Patterson AFB, Ohio. (175350)

Final rept. Jan 72-May 74
AUTHOR: Brindley, A. E.; Calhoun, L. C.; Patton, T N.; Valcik, L.

C4195F3 Fld: 17G, 85A GRAI7507
Aug 74 301p
Contract: F33615-72-C-1024
Monitor: AFFDL TR-74-62-Vol-1
See also Volume 2, AD/A-004 420

Abstract: The report describes the efforts undertaken by IITRI in support of USAF's microwave landing system concept validation program. It is concluded that the doppler guidance technique is conceptually sound but that considerable work is required to improve the implementation of the technique: fundamental research in the area of multipath reflections is strongly recommended.

Descriptors: *Landing aids, Microwave equipment, Instrument landings, Doppler systems, Multipath transmission, Systems analysis, Data acquisition, Flight testing, Field tests, Data processing

Identifiers: NTISDODAF

AD/A-004 419/8ST NTIS Prices: PC A14/MF A01

Analysis, Test and Evaluation Support to the USAF Advanced Landing System Program. Volume III, Part 1. Doppler MLS Guidance Error Data (DOTS Tracking System)

IIT Research Inst Chicago Ill*Air Force Flight Dynamics Lab., Wright-Patterson AFB, Ohio. (175350)

Final rept. Jan 72-May 74
AUTHOR: Brindley, A. E.; Calhoun, L. C.; Patton, T. N.; Valcik, L.
C4195G1 Fld: 17G, 85A GRAI7507
Aug 74 257p
Contract: F33615-72-C-1024
Monitor: AFFDL-TR-74-62-Vol-3-Pt-1
See also Volume 2. AD/A-004 420, and Volume 3, Part 2. AD/A-004 422.

Abstract: Volume III, Part I contains guidance error data for the Doppler MLS computed from the Digital Optical Tracking System (DOTS) information. Separate plots are included for the azimuth system and the elevation system. Volume III, Parts 1, 2, and 3 contain the data used in determining the findings presented in Volume I.

Descriptors: *Landing aids, Microwave equipment, Instrument landings, Doppler systems, Systems engineering, Errors, Guidance, Digital systems, Optical tracking

Identifiers: *Microwave landing systems, NTISDODAF

AD/A-004 421/4ST NTIS Prices: PC A12/MF A01

Analysis, Test and Evaluation Support to the USAF Advanced Landing System Program. Volume II. Index of Approaches

IIT Research Inst Chicago Ill*Air Force Flight Dynamics Lab., Wright-Patterson AFB, Ohio. (175350)

Final rept. Jan 72-May 74
AUTHOR: Brindley, A. E.; Calhoun, L. C.; Patton, T. N.; Valcik, L.
C4195F4 Fld: 17G, 85A GRAI7507
Aug 74 73p
Contract: F33615-72-C-1024
Monitor: AFFDL-TR-74-62-Vol-2
See also Volume 1, AD/A-004 419, and Volume 3, Part 1, AD/A-004 421.

Abstract: Volume II is an index of the approaches flown during the MLS Concept Validation Program. Part I lists the approaches in the order that they were flown; it also contains information on the magnetic storage location of reduced data. An explanation of the terms used is given as is a code for the notes used on the index of data. Data from these approaches are plotted and contained in Volume III. Part II is a listing of the approaches after sorting. The sorting brings together similar approaches for comparison purposes.

Descriptors: *Landing aids, Microwave equipment, Instrument landings, Systems engineering, Flight testing, Doppler systems, Data acquisition, Approach, Data processing

Identifiers: *Microwave landing systems, NTISDODAF

AD/A-004 420/6ST NTIS Prices: PC A04/MF A01

Analysis, Test and Evaluation Support to the USAF Advanced Landing System Program. Volume III, Part 3. Doppler MLS Guidance Error Data. (M-33 Tracking System - Flights 12 Sept. 1973 to 29 Jan. 1974)

IIT Research Inst Chicago Ill*Air Force Flight Dynamics Lab., Wright-Patterson AFB, Ohio. (175350)

Final rept. Jan 72-May 74
AUTHOR: Brindley, A. E.; Calhoun, L. C.; Patton, T. N.; Valcik, L.
C4195G3 Fld: 17G, 85A GRAI7507
Aug 74 282p
Contract: F33615-72-C-1024
Monitor: AFFDL-TR-74-62-Vol-3-Pt-3
See also Volume 3, Part 2, AD/A-004 422.

Abstract: Volume III, Part 3 is a collection of the guidance error data for the Doppler Microwave Landing System (DMLS) which was computed from the M-33 tracking radar information. Separate plots are included for the azimuth system and the elevation system. Part 3 contains data from test flights flown between 12 September 1973 and 29 January 1974. Volume III Parts 1, 2, and 3 contain the data used in determining the findings presented in Volume I.

Descriptors: *Landing aids, Microwave equipment, Instrument landings, Doppler systems, Systems engineering, Errors, Guidance, Radar tracking

Identifiers: *Microwave landing systems, NTISDODAF

AD/A-004 423/0ST NTIS Prices: PC A13/MF A01

Analysis, Test and Evaluation Support to the USAF Advanced Landing System Program. Volume III, Part 2. Doppler MLS Guidance Error Data. (M-33 Tracking System - Flights 22 June 1973 to 10 Sept. 1974)

IIT Research Inst Chicago Ill*Air Force Flight Dynamics Lab., Wright Dynamics Lab., Wright-Patterson AFB, Ohio. (175350)

Final rept. Jan 72-May 74
AUTHOR: Brindley, A. E.; Calhoun, L. C.; Patton, T. N.; Valcik, L.
C4195G2 Fld: 17G, 85A GRAI7507
Aug 74 322p
Contract: F33615-72-C-1024
Monitor: AFFDL-TR-74-62-Vol-3-Pt-2
See also Volume 3, Part 1, AD/A-004 421, and Volume 3, Part 3, AD/A-004 423.

Abstract: Volume III, Part 2 is a collection of the guidance error data for the Doppler Microwave Landing System (DMLS) which was computed from the M-33 tracking radar information. Separate plots are included for the azimuth systems and the elevation system. Part 2 contains data from test flights flown between 22 June 1973 and 10 September 1973. Volume III, Parts 1, 2, and 3 contain the data used in determining the findings presented in Volume I.

Descriptors: *Landing aids, Microwave equipment, Instrument landings, Doppler systems, Systems engineering, Errors, Guidance, Radar tracking

Identifiers: *Microwave landing systems, NTISDODAF

AD/A-004 422/2ST NTIS Prices: PC A14/MF A01

Multipath Environment Evaluation

IIT Research Inst Chicago Ill*Air Force Flight Dynamics Lab., Wright-Patterson AFB, Ohio. (175350)

Final rept. May-Nov 74
AUTHOR: Brindley, A. E.; Calhoun, L. C.; Patton, T. N.
C4195I4 Fld: 17G, 17B, 76C, 45B GRAI7507
Nov 74 541p
Contract: F33615-72-C-1024
Project: AF-404L
Monitor: AFFDL-TR-74-150

Abstract: This report describes an experimental program aimed at evaluating the multipath environment typical of that which will challenge C-band microwave landing systems. The report describes the ground and air testing conducted in the Area B complex of Wright-Patterson Air Force Base, Ohio, and includes a wealth of data gathered with the aid of MLS hardware used on the prior phase of this program. A substantial fraction of the effort was devoted to measurements made on a large reflecting screen used by FAA in the test phase of Phase II of the National Landing Plan. It is concluded from the data gathered at Wright-Patterson AFB, that multipath signals generated by the use of the screen in isolation (as at NAFEC and Wallops) are quite dissimilar to those observed from real-life structures in their spatial characteristics. It is further concluded that typical hangars have quite similar reflection characteristics, almost independent of their constructional details.

Descriptors: *Landing aids, *Multipath transmission, *Doppler systems, Specular reflection, Continuous waves, Antenna radiation patterns, C band

Identifiers: Microwave landing systems, NTISDODAF

AD/A-004 432/1ST NTIS Prices: PC A23/MF A01

FAA/DOD Liaison in Management of the National Aviation System

Air Force Inst of Tech Wright-Patterson AFB Ohio School of Engineering (012225)

Master's thesis
AUTHOR: Brooks, Ronald S.; Beatty, Jerry L.
C3751J3 Fld: 17G, 85A GRAI7426
Sep 74 159p
Rept No: GSM/SM/74S-2
Monitor: 18

Abstract: This study describes and analyzes military and FAA liaison efforts which impact on the management of the National Aviation System. It begins with the historical development of the National Aviation System (NAS). The system is evolutionary in nature and most innovations have come from user demands and outside sources. Long term government responsibility to manage the system has been secondary to the operation and maintenance functions. There has been duplication of effort due to poor coordination on developing technology that led to improvement of the system. The methodology used was research of historical and contemporary literature, supplemented by personal interviews with individuals currently involved directly in the liaison process. The combination of extensive personal interviews and the many general and technical reports available emphasize the fractionalized responsibilities within the system and provide a diverse information base that is unavoidably large. (Modified author abstract)

Descriptors: *Air traffic control systems, *United States government, Department of Defense, Technology, Transfer, Landing aids, Air traffic, Theses

Identifiers: *Federal Aviation Administration, *Liaison, *Microwave landing systems, NTISDODAF

AD-787 208/8SL NTIS Prices: PC A08/MF A01

The Effect of Measurement Errors and Computational Approximations on a Perspective Ilm Radar Image

National Aeronautics and Space Administration. Langley Research Center, Langley Station, Va.
AUTHOR: Bundick, W. T.
C5114G2 Fld: 01B, 51B STAR1316
1975 151p
Rept No: NASA-TM-X-72685
Monitor: 18

Abstract: The effect was examined of aircraft position and attitude, of measurement errors, and of computational approximations on the size, shape, and position of a perspective radar image of an airport runway as might be displayed by an independent landing monitor in transport aircraft. The effect on runway image geometry was examined for different aircraft attitudes and different aircraft positions relative to a standard three degree glide slope. Measurement errors investigated were errors in radar azimuth angle and range, and errors in those aircraft parameters supplied to the radar for use in converting the radar image into a perspective format (namely pitch, roll, and altitude). Also investigated were the effects of using certain mathematical approximations, such as small angle, in the coordinate transformation which converts the image to a perspective format. (Author)

Descriptors: *Imaging techniques, *Microwave landing systems, *Radar imagery, *Runways, Computer techniques, Error analysis, Flight paths, Numerical analysis, Transport aircraft

Identifiers: NTISNASA

N75-24764/3ST NTIS Prices: PC A08/MF A01

Spectal Analysis of Doppler MLS Video Data

IIT Research Inst Chicago Ill*Air Force Flight Dynamics Lab., Wright-Patterson AFB, Ohio. (175350).

Final rept. 26 Aug-16 Dec 74
AUTHOR: Calhoun, L. C.; Kazel, S.; Brindley, A. E.
C4363B4 Fld: 17G, 76D, 85A GRAI7509
Jan 75 29p
Contract: F33615-72-C-1024
Project: AF-404L
Monitor: AFFDL-TR-75-6

Abstract: The report describes an experimental effort to examine the spectral content of flight test data recorded during Phase II of the National Landing Plan. The data examined here were obtained from the ITT and Hazeltine doppler systems flown at NAFEC and Wallops Station respectively. A primary objective of the effort was to determine from the spectra whether in fact either of the systems experienced significant multipath interference during flight tests. The hardware used for this analysis was an improved version of that generated by IITRI for the USAF's Concept Validation Program.

Descriptors: *Instrument landings, *Landing aids, Video signals, Spectrum analysis, Spectra, Time division multiplexing, Doppler systems, Multipath transmission, Flight testing

Identifiers: *Microwave landing systems, NTISDODAF

AD/A-006 436/0ST NTIS Prices: PC A03/MF A01

The Design, Development, and Flight Test Results of the Boeing 737 Aircraft Antennas for the Icao Demonstration of the Trsb Microwave Landing System

National Aeronautics and Space Administration. Langley Research Center, Langley Station, Va.
AUTHOR: Campbell, T. G.; White, W. E.; Gilreath, M. C.
D0362A2 Fld: 17G, 9E, 85A, 76D, 49A STAR1423
17 Aug 76 96p
Rept No: NASA-TM-X-73943
Monitor: 18

Abstract: The Research Support Flight System, a modified Boeing 737, was used to evaluate the performance of several aircraft antennas and locations for the Time Reference Scanning Beam (TRSB) Microwave Landing System (MLS). These tests were conducted at the National Aviation Facilities Experimental Center (NAFEC), Atlantic City, New Jersey on December 18, 1975. The flight tests measured the signal strength and all pertinent MLS data during a straight-in approach, a racetrack approach, and ICAO approach profiles using the independent antenna-receiver combinations simultaneously on the aircraft. Signal drop-outs were experienced during the various approaches but only a small percentage could be attributed to antenna pattern effects. (Author)

Descriptors: *Aircraft antennas, *Antenna design, *Boeing 737 aircraft, *Flight tests, *Microwave landing systems, Antenna radiation patterns, Civil aviation, Instrument approach, Scanners

Identifiers: NTISNASA

N76-32146/2ST NTIS Prices: PC A05/MF A01

Multipath Parameter Computations for the MLS Simulation Computer Program

Massachusetts Inst of Tech Lexington Lincoln Lab (207650)

Project rept.
AUTHOR: Capon, Jack
C6624K2 Fld: 1C, 17B, 9B, 1E, 85A, 76C, 62B GRAI7614
8 Apr 76 194p
Rept No: ATC-68
Contract: DOT-FA74WAI-461
Monitor: FAA-RD-76-55

Abstract: A set of mathematical models and computer programs have been developed to characterize multipath propagation in an airport environment. When combined with system mathematical models, these models are intended to provide a firm technical basis for assessing the performance of candidate Microwave Landing Systems (MLS) in realistic airport environments. The two paramount issues in developing these models have been (1) validation based on actual field test data and (2) computer running time. The obstacles modeled include buildings and aircraft, as well as the ground which can cause both specular reflections and diffuse scattering. In addition, the shadowing effects due to runway humps, and aircraft, buildings approaching the line of sight between transmitter and receiver are included. Computational procedures are presented for obtaining the salient multipath parameters, i.e., relative magnitude, phase, directional angles, Doppler frequency, and time delay. Computer programs have been written for these algorithms using the Fortan programming language, with structured programming methods, such as Iftran, employed whenever possible. A presentation is given of computer validation data for the computational procedures. A comparison of these computer validation results with experimental field data demonstrates good agreement in all cases of interest. The computer running time for these computer programs is quite reasonable, e.g., it takes about five times longer than actual flight time to run a model of a typical airport environment on an IBM 370 model 168. (Author)

Descriptors: *Microwave landing systems, *Multipath transmission, *Computerized simulation, *Mathematical models, L band, C band, Computer programs, Validation, Field tests, Fortran, Programming languages, Airports, Landing fields, Flat plate models

Identifiers: IBM 370 compute, model 168, Structured programming, NTISDODXA, NTISDODFAA, NT SDOTFAA

AD-A024 350/1ST NTIS Prices: PC A09/MF A01

Theory and Experiments on Precision L-Band DME

Fondazione Ugo Bordoni, Rome (Italy).
AUTHOR: Chiarini, F.; Falciasecca, G.; Graziani, D.
F1973B1 Fld: 17G, 85A STAR1718
Dec 77 25p
Rept No: FUB-44-1977
Monitor: 18

Abstract: A preliminary report is given on studies and experiments conducted on the problems of increasing the accuracy of existing DME systems for use with microwave landing systems (MLS). Studies made on multipath errors suggested the use of a computer model which includes the area, the airport, and the receiver model. A mathematical expression of the receiver model is given. Improvement in accuracy can be obtained if the processing of many measurements is adapted to estimating the aircraft position. This procedure, however, was proved to reduce only the errors due to the electronic equipment. An example of a simple data processing procedure is given. The relationship between shape and frequency spectrum of a pulse was anlayzed. A pulse synthesizer built to facilitate the generation of special pulse shapes is described. Results of these investigations are given.

Descriptors: *Distance measuring equipment, *Microwave landing systems, Ultrahigh frequencies, Aircraft landing, Computerized simulation, Multipath transmission, Pulse frequency modulation, Signal processing

Identifiers: NTISNASAE, NTISFNIT

N79-27124/3ST NTIS Prices: PC A02/MF A01

Position Determination Accuracy from the Microwave Landing System

National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
AUTHOR: Cicolani, L. S.
C0593F1 Fld: 17G, 51F STAR1106
Jan 73 39p
Rept No: NASA-TN-D-7116; A-4176
Monitor: 18

Abstract: Analysis and results are given for the position determination accuracy obtainable from the microwave landing guidance system. Siting arrangements, coverage volumes, and accuracy standards for the azimuth, elevation, and range functions of the microwave system are discussed. Results are given for the complete coverage of the systems and are related to flight operational requirements for position estimation during flare, glide slope, and general terminal area approaches. Range rate estimation from range data is also analyzed. The distance measuring equipment accuracy required to meet the range rate estimation standards is determined, and a method of optimizing the range rate estimate is also given. (Author)

Descriptors: *Aircraft landing, *Aircraft safety, *Distance measuring equipment, *Instrument landing systems, *Microwave equipment, Approach control, Approach indicators, Navigation aids, Terminal facilities

N73-15681 NTIS Prices: PC A03/MF A01

Tower-Related Major System Development Programs

Transportation Systems Center Cambridge Mass (407082)

Interim rept. Apr-Jun 77
AUTHOR: Clapp, D.; Rempfer, P.; Devoe, D.; Bellantoni, J.; Stevenson, L.
E1703I4 Fld: 17G, 9B, 1E, 85A, 85D GRAI7817
Mar 78 317p
Rept No: TSC-FAA-78-2
Monitor: FAA-EM-77-16
See also Rept. nos. TSC-FAA-77-19, FAA-EM-77-10, AD-A048 306.

Abstract: This report is devoted to the present and near future states of the tower cab environment, addresses those MSDP systems which may have an impact on the current tower cab environment, systems and/or operations. The systems included are: Discrete Address Beacon System (DABS), Airport Surface Detection Equipment III (ASDE III), Tower Airport Ground Surveillance (TAGS), Terminal Information Processing System (TIPS), ARTS II and ARTS III enhancements, Flight Service Station Automation (FSSA), Vortex Advisory System (VAS), Wake Vortex Avoidance System (WVAS), Wind Shear Detection system (WSD) and Microwave Landing System (MLS). Each system is described in terms of its functional objectives, planned equipment, interfaces with other systems and with controllers, failure modes, and current development/deployment status. This report is a continuation of report No. FAA-EM-77-10/(DOT-TSC--FAA-77-19) entitled: 'Characterization of Current Tower Cab Environments', dated November 1977 (240 pages). (Author)

Descriptors: *Air traffic control systems, *Air traffic controllers, *Display systems, *Airport control towers, Data processing, Plan position indicators, Microwave landing systems, Vortices, Airport radar systems

Identifiers: Tower cab systems, BRITE displays, Airport surveillance, Wake, Vortex avoidance systems, Vortex advisory systems, Discrete address beacon systems, Wind shear detection systems, NTISDODXA

AD-A054 608/5ST NTIS Prices: PC A14/MF A01

Tracals Evaluation Report. Special Evaluation Report. AN/GRN-27 SSILS Glide Slope, Tyndall AFB, Florida, 22-26 January and 8-9 February 1980

Facility Checking Squadron (1866th) (AFCS) Scott AFB IL (408827)

Final rept.
AUTHOR: Clark, Allen D.
G1985J1 Fld: 17G, 85A GRAI8021

30 May 80 48p
Rept No: 80/66S-197
Availability: Microfiche copies only.

Abstract: This special evaluation was conducted to determine if the SSILS was performing optimally and if not, would a different equipment configuration improve performance. The equipment was reconfigured to capture effect and recommissioned by the 1866 Facility Checking Squadron.

Descriptors: *Glide slope, Air Force facilities, Florida, Airports, Runways, Microwave landing systems, Solid state electronics, Antenna radiation patterns, Area coverage, Operational effectiveness, Performance(Engineering), Flight testing, Measurement

Identifiers: *AN/GRN-27, *TRACALS Project, SSILS(Solid State Instrument Landing System), Tyndall Air Force Base, NTISDODXA

AD-A086 153/4 NTIS Prices: MF A01

TRACALS Evaluation Report. Special Evaluation Report, AN/GRN-29(V) SSILS, Ellsworth AFB, South Dakota, 13-25 August 1979 and 7-14 November 1979

Facility Checking Squadron (1866th) (AFCS) Scott AFB IL (408827)

Final rept.
AUTHOR: Clark, Allen D.
G0812K4 Fld: 1E, 17G, 85A GRAI8011
Dec 79 98p
Rept No: 79/66S-183

Abstract: This report presents the results of the 13-25 Aug and 7-14 Nov 1979 TRACALS Evaluation of the Ellsworth AFB AN/GRN-29(V) SSILS serving Runway 13. The evaluation was conducted to determine if the SSILS was performing optimally in its present location and if not, would a different equipment configuration or new location improve performance. Results presented in this report can be used as a guide to anticipated performance until there is a change in ground equipment, phasing, siting environment, screening or operational use. (Author)

Descriptors: *Microwave landing systems, *Instrument landings, *Air traffic control systems, Ground support equipment, Air Force facilities, Airports, Glide slope, Test and evaluation, South Dakota

Identifiers: *AN/GRN-29, TRACALS project, Ellsworth Air Force Base, NTISDODXA

AD-A080 657/0 NTIS Prices: PC A05/MF A01

TRACALS Evaluation Report. SSILS Initial Evaluation Report, Wurtsmith AFB, Michigan, 10-22 April 1980

Facility Checking Squadron (1866th) (Afcs) Scott AFB IL (408827)

Final rept.
AUTHOR: Clark, Allen D.; Carroll, Gus E.
G2785K4 Fld: 17G, 85A GRAI8101
5 Aug 80 130p
Rept No: 80/66N-211

Abstract: This report presents the results of the 10-22 April 1980 TRACALS evaluation of the Wurtsmith AFB AN/GRN-29 SSILS serving Runway 24. The evaluation was conducted to determine the capabilities and limitations of the system in its installed environment. Results presented in this report can be used as a guide to anticipated performance until there is a significant change in ground equipment, siting environment, screening or operational use. (Author)

Descriptors: *Instrument landings, *Microwave landing systems, Ground support equipment, Solid state electronics, Glide slope, Site selection, Computerized simulation

Identifiers: TRACALS project, AN/GRN-29, Wurtsmith Air Force Base, NTISDODXA

AD-A088 546/7 NTIS Prices: PC A07/MF A01

METEOROLOGICAL ANALYSIS OF 1964-65 ICAO TURBULENCE DATA

Weather Bureau, Silver Spring, Md. Techniques Development Lab. (402 455)

Technical memo.
AUTHOR: Colson, DeVer
5385G4 Fld: 4B USGRDR6902
Oct 68 85p*
Rept No: WBTM-TDL-14

Abstract: Summaries are given of clear air turbulence (CAT) data over Alaska, Canada, Greenland, North Atlantic, Caribbean, Mexico, and Central America during four 5-day periods (December 1964, March, June, and September 1965) in the ICAO worldwide high-level turbulence collection program. Turbulence reports are summarized by intensity, altitude layer (<30,000, 30,000-33,999, >34,000 ft.), and location by 5-degree latitude-longitude square. Meteorological analyses are presented showing probability of moderate or greater turbulence in relation to 300-mb circulation patterns, jet streams, isotachs, horizontal wind shear, and contour gradients. While no sharply defined criteria are established for routine prediction of occurrence of intensity of CAT, some interesting meteorological patterns associated with unusually turbulent conditions are shown. The study illustrates the importance of large values of wind speed, wind shear, and contour gradients and also rapidly increasing values of these parameters. The study particularly shows the importance of sharply curved flow patterns around troughs and ridges. In general, the probability of both light or greater, and moderate or greater turbulence decreased with increasing altitude, but severe turbulence was more frequent in the top layer than in the two lower layers. (Author)

Descriptors: (*Clear air turbulence, Meteorological parameters), Periodic variations, Probability, Altitude, Intensity, Velocity, North America, Atlantic Ocean

Identifiers: North Atlantic Ocean

PB-180 268 CFSTI Prices: PC A05/MF A01

Predictions of Interference-Reflection Zones for Scanning Beam Instrument Landing Systems

Army Electronics Command Fort Monmouth N J (037620)

Research and development technical rept.
AUTHOR: Cornelious, Eddie L.
C2364G1 Fld: 17G, 85A GRAI7407
Jan 74 55p
Rept No: ECOM-4188
Project: DA-1-F-162202-AA-97
Task: 1-F-162202-AA-9715
Monitor: 18

Abstract: To predict reflection/interference zones for scanning beam Instrument Landing Systems, representative situations for an airport environment were selected in developing multipath models. Interfering signals reflected from a large building near a runway will usually be confined to well defined specular regions. The interfering reflecting signal magnitude in these regions can be large. The report presents these regions of interfering reflections in graphic form for various reflecting surface orientations and lateral distances between the radiating source and the reflecting surface. (Author)

Descriptors: *Instrument landings, Scanning, Beams(Radiation), Multipath transmission, Reflection, Interference, Polarization

Identifiers: Microwave landing systems, A

AD-773 822/2 NTIS Prices: PC A04/MF A01

Scale Model Glide Slope Facility

All Farmingdale N Y*Federal Aviation Administration, Washington, D.C. Systems Research and Development Service. (407457)

Interim rept. Sep 73-Jun 75
AUTHOR: Creedon, Neil J.
C5721F4 Fld: 17G, 85A, 76D GRAI7603
Jul 75 22p
Rept No: AIL-FGS-A414-1
Contract: DOT-FA74WA-3345
Monitor: FAA-RD-75-202

Abstract: The report describes the fabrication of a 1/30 Scale Model Glide Slope system. The process used to achieve the required amplitude modulation of a 9 GHz carrier is detailed.

Descriptors: *Glide slope, Scale models, Glide path systems, Microwave equipment, Instrument landings

Identifiers: DOT/417/ID, Microwave landing systems, NTISDODFAA, NTISDOTFAA

AD-A018 436/6ST NTIS Prices PC A02/MF A01

Combining Data for MLS Implementation Applications

Avcon Universal Consultants Corp Baden Pa*Federal Aviation Administration, Washington, D.C. Systems Research and Development Service. (408868)

Final rept.
AUTHOR: Croswell, T. L.
C5781D1 Fld: 17G, 9B, 85A GRAI7604
Jun 75 60p
Rept No: AV-MLS-75-3
Monitor: FAA-RD-75-200
See also report dated Jun 74, AD-785 220.

Abstract: The report describes the combination of data for Microwave Landing System implementation planning. Special computer programs were developed and applied to extract, sort, combine and produce sample applications of information derived from the FAA Airport Master Record File, Facility Master File, Air Traffic Activity tapes and other sources of pertinent data.

Descriptors: *Microwave landing systems, Data processing, Computer programs, Planning, Data bases, FORTRAN

Identifiers: DOT/417/ID, Criteria, NTISDODFAA, NTISDOTFAA

AD-A018 850/8ST NTIS Prices: PC A04/MF A01

Cost Analysis of the Microwave Landing System Program

Mitre Corp Mclean Va (402364)

Final rept.
AUTHOR: Croswell, Thomas L.
A3762H4 Fld: 17G, 51F, 51H GRAI7207
Dec 71 108p
Rept No: MTR-6068
Contract: DOT-FA70WA-2448
Monitor: FAA-EM-71-1

Abstract: The report describes a cost study performed for the new replacement all weather instrument landing system. Costs are determined for two Scenarios: A - following the National Plan for Microwave Landing Systems, and B - those currently operational systems (GCA - ILS ...) expected to exist in the absence of the national MLS. For civil ground systems, Scenario A (MLS) produces a significant cost saving; resulting principally from the elimination of restrictive site requirements and reduced frequency of flight inspections. Military ground systems also favor MLS due to earlier retirement of GCA systems. Both of these cost savings are offset by the extra cost of airborne MLS, especially to the more than 700,000 general aviation aircraft projected for the year 2000. Over a 30-year period, the total costs to the nation under the MLS plan are not significantly higher than costs of continuing with current systems. The conclusion is that the lack of a cost penalty, combined with the performance, safety, and economic benefits, make a solid case for MLS. (Author)

Descriptors: (*All-weather aviation, *Instrument landings), Landing aids, Microwave equipment, Costs, Aviation safety, Civil aviation

Identifiers: *Instrument landing systems, *Microwave landing systems, Cost analysis

AD-737 036 NTIS Prices: PC A06/MF A01

Development of Microwave Landing System Implementation Criteria

Avcon Universal Consultants Corp Baden Pa*Federal Aviation Administration, Washington, D.C. Systems Research and Development Service. (408868)

Final rept.
AUTHOR: Croswell, Thomas L.
C3535K4 Fld: 17G, 85A GRAI7423
Jul 74 50p
Rept No: AV-MLS-74-1
Monitor: FAA-RD-74-121

Abstract: The study derives guidelines for MLS implementation planning from basic safety requirements for landing systems, from contemporary qualification criteria and from existing system status. A quantitative method is developed to facilitate evaluation of alternative MLS implementation plans, based on the conclusion that instrument approaches to ILS and MLS represent an increase in safety over approaches made to non-precision facilities. Substantiation of this conclusion, validation of the method, projection of instrument approaches and other steps leading to a detailed MLS implementation schedule are defined and their accomplishment recommended. (Author)

Descriptors: *Landing aids, Microwave equipment, Planning

Identifiers: *Microwave landing systems, NTISDODFAA, NTISDOT

AD-785 220/5 NTIS Prices: PC A03/MF A01

Processing Instrument Approach for Microwave Landing System Implementation

Avcon Universal Consultants Corp Baden Pa*Federal Aviation Administration, Washington, D.C. Systems Research and Development Service. (408868)

Final rept.
AUTHOR: Croswell, Thomas L.
C5912G3 Fld: 17G, 9B, 85A GRAI7606
Jun 75 68p
Rept No: AV-MLS-74-2
Monitor: FAA-RD-74-182

Abstract: The report describes the special computer programs developed under this contract and their application to Microwave Landing System (MLS) implementation planning. It provides familiarization with the data sources, programs and applications; reference documentation for the programs developed; and is a training guide and applications manual for these programs. This study produced a specially tailored data base combining information from several sources to facilitate the use of this information in the development of MLS implementation programs.

Descriptors: *Microwave landing systems, *Computer programs, FORTRAN, Data processing, Instrument flight

Identifiers: DOT/4IZ/ID, NTISDODFAA, NTISDOTFAA

AD-A019 762/4ST NTIS Prices: PC A04/MF A01

Utilizing Facilities Master File Data for Microwave Landing System Implementation

Avcon Universal Consultants Corp Baden Pa*Federal Aviation Administration, Washington, D.C. Systems Research and Development Service. (408868)

Final rept.
AUTHOR: Croswell, Thomas L.
C4133H3 Fld: 17G, 9B, 85A GRAI7506
Oct 74 31p
Rept No: AV-MLS-74-3
Monitor: FAA-RD-74-183

Abstract: The report describes the development of specialized computer programs to incorporate data from the Airway Facilities Master File (FMF) and their applications to Microwave Landing System (MLS) implementation planning. The objectives of this study, descriptions of the FMF, listings of the programs developed and examples of the MLS applications of the annual listings of commissioned Instrument Landing System (ILS) facilities derived from the FMF data are included.

Descriptors: *Landing aids, Instrument landings, Computer programs, FORTRAN

Identifiers: DOT/4IZ/ID, *Microwave landing systems, Instrument landing systems, NTISDODFAA, NTISDOT

AD/A-003 818/2ST NTIS Prices: PC A03/MF A01

Flight Simulation Study to Determine MLS Lateral Course Width Requirements on Final Approach for General Aviation

Crumrine (Ralph J.), Olathe, Kans.
AUTHOR: Crumrine, R. J.
D0232A4 Fld: 17G, 1C, 76C, 51C STAR1422
Jul 76 35p
Rept No: NASA-CR-137859
Contract: NASA ORDER A-15538-B
Monitor: 18

Abstract: An investigation of the effects of various lateral course widths and runway lengths for manual CAT I Microwave Landing System instrument approaches was carried out with instrument rated pilots in a General Aviation simulator. Data are presented on the lateral dispersion at the touchdown zone, and the middle and outer markers, for approaches to 3,000, 8,000 (and trial 12,000 foot) runway lengths with full scale angular lateral course widths of + or - 1.19 deg, + or - 2.35 deg, and + or - 3.63 deg. The distance from touchdown where the localizer deviation went to full scale was also recorded. Pilot acceptance was measured according to the Cooper-Harper rating system. (Author)

Descriptors: *General aviation aircraft, *Microwave landing systems, *Air traffic control, Flight simulation, Runway conditions, Aircraft landing, Aircraft pilots, Instrument landing systems, Takeoff

Identifiers: NTISNASA

N76-31215/6ST NTIS Prices: PC A03/MF A01

Polarization/Multipath Study, August 1971 through June 1972

Army Electronics Command Fort Monmouth NJ Avionics Lab (387890)
AUTHOR: Demko, Paul S.
F0822H1 Fld: 17G, 9B, 85A, 76D GRAI7911
Jun 72 61p
Rept No: VL-5-72
Monitor: 18

Abstract: Ku band microwave scanning beam landing systems are currently in various phases of development and use. Many parameters, such as modulation schemes, scale factors, and polarization have not yet been standardized. The intent of this study is to examine one of these areas, namely, signal polarization. This report presents evidence from exploratory investigations, model testing, computer modeling, and flight testing to show that horizontal polarization is the proper choice for Ku band landing guidance signals. (Author)

Descriptors: *Microwave landing systems, *Polarization, Ku band, Electronic scanners, Orientation(Direction), Scaling factors, Computerized simulation, Laboratory tests, Flight testing, Glide slope, Low angles

Identifiers: NTISDODXA

AD-A063 265/3ST NTIS Prices: PC A04/MF A01

Refinement and Validation of Two Digital Microwave Landing System (Mls) Theoretical Models

Atlantic Research Corp., Alexandria, Va. EMM Dept.
AUTHOR: Duff, W. G.; Guarino, C. R.
C5394L1 Fld: 17G, 76C, 85A STAR1320
15 Aug 75 83p
Rept No: NASA-CR-132713
Contract: NAS1-13683
Monitor: 18

Abstract: Two digital microwave landing system theoretical models are considered which are generic models for the Doppler and scanning-beam frequency reference versions of the MLS. These models represent errors resulting from both system noise and discrete multipath. The data used for the validation effort were obtained from the Texas Instrument conventional scanning beam and the Hazeltine Doppler feasibility hardware versions of the MLS. Topics discussed include tape read software, time history plots, computation of power spectral density, smoothed power spectra, best-fit models, different equations for digital simulation, and discrete multipath errors. (Author)

Descriptors: *Computer programs, *Digital simulation, *Microwave landing systems, Doppler effect, Error analysis, Feasibility analysis, Mathematical models, Noise spectra, Power spectra

Identifiers: NTISNASA

N75-29066/8ST NTIS Prices: PC A05/MF A01

Curved Approach Path Study

Collins Radio Co Cedar Rapids Iowa (087800)

Final rept.
AUTHOR: Duning, K. E.; Hemesath, N. B.; Hickok, C. W.; Lammers, D. G.; Goemaat, M. L.
C1312J2 Fld: 17G, 51F GRAI7317
Apr 73 126p*
Rept No: 523-0764756-0011M
Contract: DOT-FA72WA-2824
Monitor: FAA-RD-72-143

Abstract: The application of MLS (microwave landing systems) to provide increased operational flexibility and improved capacity in the terminal area is discussed. The performance characteristics of the various classes of CTOL aircraft which influence terminal area flight path design are identified and documented. Terminal area operational concepts and flight path families for use in the MLS environment are developed, and examples of special noise abatement paths are discussed. The implications upon cockpit equipment of flying flexible paths in the MLS environment are addressed, and the performance of current flight control systems in tracking segmented paths is examined. (Author)

Descriptors: (*Air traffic control terminal areas, *Approach), Curved profiles, Landing aids, Flight paths, Analysis, Automatic pilots, Instrument flight, Microwave equipment

Identifiers: *Microwave landing systems, FAA

AD-763 603 NTIS Prices: PC A07/MF A01

Control-Display Testing Requirements Study

Collins Radio Co Cedar Rapids Iowa (087800)

Final rept. 24 Jan-24 Jul 72
AUTHOR: Duning, Kenneth E.; Hickok, Craig W.; Emerson, Kenneth C.; Clement, Warren F.
C0824E1 Fld: 17G, 5H, 51F, 95D GRAI7312
Dec 72 182p
Rept No: 523-0764468-0011M
Contract: F33615-72-C-1022
Monitor: AFFDL-TR-72-122
Prepared in cooperation with Systems Technology, Inc., Princeton, N.J.

Abstract: Control-display problems in terminal area navigation and zero visibility landing are identified along with related considerations for control laws and computations and requirements for sensors. Test and development program plans for research, development, and testing of controls and displays for full use of the capabilities of the microwave landing system are presented. Criteria and measurements for development and testing controls and displays are discussed. Procedures for evaluation of system performance, pilot performance, pilot acceptance, and safety are included. Alternative techniques for measuring pilot workload are outlined. Coordinated use of theoretical analysis, simulation, and flight test for development and testing of control-display systems is discussed. (Author Modified Abstract)

Descriptors: (*Air traffic control systems, *Man-machine systems), Instrument landings, Display systems, Control systems, Pilots, Performance(Human), Human engineering

Identifiers: Microwave landing systems, AF

AD-759 539 NTIS Prices: PC A09/MF A01

Flight Test Demonstration of Automatic Landings Based on Microwave Landing System Guidance

Air Force Flight Dynamics Lab Wright-Patterson AFB Ohio (012070)

Final rept. Mar-May 76
AUTHOR: Eastman, Don; Clough, P.
D0135L1 Fld: 1D, 17G, 18, 51C, 51B, 76 GRAI7701
Aug 76 55p
Rept No: AFFDL-TR-76-105
Monitor: 18

Abstract: This report describes the USAF participation in the gathering of data for the United States submission to the International Civil Aviation Organization of a Non-Visual Precision Approach and Landing System for International Aviation. The report contains data on Time Referenced Scanning Beam Microwave Landing System accuracy, as recorded on the test aircraft during automatic approaches and landings. The report contains information on aircraft performance and pilot acceptance for performing automatic MLS instrument approaches and landings. The USAF modified T-39 aircraft was capable of flying fully coupled and automatic curved and segmented approaches through landing using TRSB MLS data. The purpose of the flight testing was to demonstrate an inherent TRSB MLS capability rather than to provide a great amount of MLS accuracy or performance data. (Author)

Descriptors: *Microwave landing systems, *Aircraft landings, *Instrument landings, Flight testing, Digital systems, Flight control systems, Automatic pilots, Approach, Accuracy, Scanning

Identifiers: NTISDODXA

AD-A031 777/6ST NTIS Prices: PC A04/MF A01

DME-Based System for Enroute/Terminal Navigation, All-Weather Landing and Air Traffic Control

Standard Electrik Lorenz A.G., Stuttgart (West Germany).
AUTHOR: Eckert, K. D.
E1903I4 Fld: 17G, 85A, 76D STAR1614
1976 13
Monitor: 18

Abstract: The DME system, which has found wide spread worldwide application in the civil and military area as well, includes, due to its ingenious signal format and the very economic channeling scheme, a considerable potential for additional applications. Today's navigation and air traffic control systems have at least partly reached their limits of improvement and extension as the call for a Microwave Landing System (MLS) proves. The growth potential of the ICAO-standardized Distance Measuring Equipment (DME) allows for various operational extensions by improving the distance measuring system to Precision Distance Measuring System (PDME) and using DME interrogations by direction finders on the ground, measuring azimuth and elevation. The operational applications of these features are the DME-based Landing System (DLS), the FRGs contribution to the international MLS competition of ICAO, the additional use of the DLS-A ground subsystem as TMA-navaid, the extension of this principle to the enroute-navigation called DENS for DME-based Enroute Navigation System, the universal DLS/DME/DENS = DLENS airborne equipment, and last but not least the step into the ATC/CAS-field with DACS (DME-based Air traffic Control System). The paper explains the systematic and technical background of this aeronavigational system An analysis of the various subsystems detailing these advantages compared to today's installations dealing with the areas of operational performance and economic efficiency mainly, is given.

Descriptors *Air traffic control, *All-weather air navigation, *Distance measuring equipment, *Navigation aids, Microwave landing systems, Radio direction finders, Surveillance radar, Tacan

Identifiers: West Germany, NTISNASAE

N78-23078/6ST NTIS Prices: PC A02/MF A01

MLS Multipath Studies. Phase 3. Volume I. Overview and Propagation Model Validation/Refinement Studies

Massachusetts Inst of Tech Lexington Lincoln Lab*Federal Aviation Administration, Washington, DC. Systems Research and Development Service (207650)

Final rept.
AUTHOR: Evans, J. E.; Dolinar, S. J.; Sun, D. F.; Shnidman, D. A.
G2472E3 Fld: 17G, 85A GRAI8025
25 Apr 79 383p
Rept No: ATC-88-VOL-1
Contract: DOT-FA74WAI-461
Monitor: FAA-RD-79-21-VOL-1
See also Volume 2, AD-A088 001.

Abstract: This phase of the US national Microwave Landing System (MLS) program worked toward developing a computer simulation model of MLS multipath effects, the experimental validation of the model, and application of the model to investigate multipath performance of ICAO proposals for the new approach and landing guidance system. This first volume presents an overview of the overall simulation results as well as a description of the refined mathematical models and validation of the propagation portion of the simulation. Specific propagation topics include: (1) preliminary results for validation of models for reflections from rough and/or rising terrain based on L-band field data; (2) validation of the models for building reflections based on field measurements at a number of operational airports; and (3) validation and refinement of the models for angle guidance system shadowing by obstacles such as buildings and other objects.

Descriptors: *Microwave landing systems, *Multipath transmission, *Aircraft landings, Diffraction, Landing fields, Experimental data, Measurement, Simulation, L band, Validation, Obscuration, Guidance

Identifiers: Shadowing, NTISDODXA, NTISDOTFAA

AD-A087 827/2 NTIS Prices: PC A17/MF A01

MLS Multipath Studies. Phase 3. Volume II. Development and Validation of Model for MLS Techniques

Massachusetts Inst of Tech Lexington Lincoln Lab*Federal Aviation Administration, Washington, DC. Systems Research and Development Service (207650)

Final rept.
AUTHOR: Evans, J. E.; Dolinar, S. J.; Shnidman, D. A.; Burchsted, R. C.

G2643C4 Fld: 17G, 85A GRAI8026
7 Feb 80 332p
Rept No: ATC-88-Vol-2
Contract: F19628-80-C-0002, DOT-FA74-WAI-461
Monitor: FAA-RD-79-21-VOL-2
See also Volume 1, AD-A087 827.

Abstract: This report presents work done during phase 3 of the US national Microwave Landing System (MLS) program toward the developing of a computer simulation mode of MLS multipath effects, the experimental validation of the model, and the application of the model to investigate multipath performance of ICAO proposals for the new approach and landing guidance system. The second volume of the report presents the mathematical models and validation data for the MLS techniques which were assessed in detail by the All weather Operations Panel of the International Civil Aviation Organiation. The specific techniques modeled are 1. The Time Reference Scanning Beam (TRSB) sysem proposed by the United States (US) and Australia, with prime emphasis on the US equipment implementation and field test data. 2. the Doppler scan (DMLS) proposed by the United Kingdom. 3. the DME Based Landing System (DLS) proposed by the Federal Republic of Germany. (Author)

Descriptors: *Microwave landing systems, *Doppler systems, *Multipath transmission, *Time signals, *Aircraft landings, Goniometers, Landing fields, Field tests, Scanning, Validation, United States, Australia, Great Britain, West Germany

Identifiers: TRSB(Time Reference Scanning Beam), DMLS(Doppler Microwave Landing System), NTISDODXA, NTISDOTFAA

AD-A088 001/3 NTIS Prices: PC A15/MF A01

MLS Multipath Studies. Volume I. Mathematical Models and Validation

Massachusetts Inst of Tech Lexington Lincoln Lab (207650)

Project rept. Mar 74-30 Sep 75
AUTHOR: Evans, J. E.; Burchsted, R. B.; Capon, J.; Orr, R. S.; Shnidman, D. A.
C6363A4 Fld: 1B, 20N, 85A GRAI7611
25 Feb 76 254p
Rept No: ATC-63
Contract: F19628-76-C-0002, DOT-FA74WAI-461
Monitor: FAA-RD-76-3-1

Abstract: This report summarizes MLS multipath work carried out at Lincoln Laboratory from March 1974 to Sept. 30, 1975. The focus of the program is the development of realistic models for 1) the multipath in representative real world environments and 2) the multipath characteristics of candidate MLS techniques. These multipath and system models are used in a comprehensive computer simulation to predict the strengths and weaknesses of major MLS systems when subjected to representative real world environments. The report is organized into two volumes. Volume I describes the algorithms and validation of various portions of the program. In volume II, the simulation)or selected protions thereof) is applied to key multipath related MLS issues. Mathematical models are given for the major MLS multipath sources (ground reflections, building and aircraft reflections, and shadowing by objects and humped runways), and it is shown that they agree well with field data (including the Lincoln measurements at Logan Airport). Models for the techniques (Doppler and scanning beam) considered in phase II of the U.S. MLS program are presented together with validation by comparison with theory and bench tests. Also persented are the results of a general study in motion averaging. The (validated) computer simulation (and portions thereof) is then applied to studying 1) the critical areas required by the TRSB system to avoid excessive reflection effects, 2) the expected TRSB performance with vertical polarization and benefits that might be derived with an alternative polarization and 3) siting of a specific TRSB system at Friendship International Airport (MD). (Author)

Descriptors: *Instrument landings, *Microwave landing systems, *Multipath transmission, Algorithms, Mathematical models, Scattering, L band, C band, Polarization, Reflection, Ground effect, Buildings

Identifiers: NTISDODXA, NTISDODFAA, NTISDOTFAA

AD-A023 040/9ST NTIS Prices: PC A12/MF A01

MLS Multipath Studies. Volume II. Application of Multipath Model to Key MLS Performance Issues

Massachusetts Inst of Tech Lexington Lincoln Lab (207650)

Project rept.
AUTHOR: Evans, J. E.; Burchsted, R. B.; Capon, J.; Orr, R. S.; Shnidman, D. A.
C6705K4 Fld: 1B, 20N, 85A GRAI7615
25 Feb 76 171p
Rept No: ATC-63-Vol-2
Contract: F19628-76-C-0002, DOT-FA74WAI-461
Monitor: FAA-RD-76-3-2
See also Volume 1, AD-A023 040.

Abstract: This report summarizes MLS multipath work carried out at Lincoln Laboratory from March 1974 to Sept. 30, 1975. The focus of the program is the development of realistic models for (1) the multipath in representative real world environments and (2) the multipath characteristics of candidate MLS techniques. These multipath and system models are used in a comprehensive computer simulation to predict the strengths and weaknesses of major MLS systems when subjected to representative real world environments. The report is organized into two volumes. Volume I describes the algorithms and validation of various portions of the program. In Volume II, the simulation (or selected portions thereof) is applied to key multipath related MLS issues.

Descriptors: *Microwave landing systems, *Instrument landings, *Multipath transmission, Aircraft, L band, C band, Computerized simulation, Algorithms, Scattering, Reflection, Runways, Electromagnetic wave reflections, Buildings

Identifiers: NTISDODXA, NTISDODFAA, NTISDOTFAA

AD-A025 108/2ST NTIS Prices: PC E04/MF A01

Dual Band Airborne Antenna Study

Michigan Univ Ann Arbor Radiation Lab*Army Electronics Command, Fort Monmouth, N.J. (294200)

Final rept. 30 Jun 73-28 Feb 74
AUTHOR: Ferris, Joseph E.
C3964H2 Fld: 9E, 49A GRAI7503
Oct 74 110p
Rept No: UMICH-012126-1-F
Contract: DAAB07-73-C-0337
Monitor: ECOM-73-0337-F

Abstract: The design and fabrication of two antenna systems is described and experimental results are presented. Each includes two antennas, one of which operates in the C band and the other operates at Ku band. Both antennas in the first system are vertically polarized while those in the second system are horizontally polarized. The antenna systems are designed for airborne use and they are interchangeable with respect to the physical mounting arrangements. Extensive data is given on pattern characteristics, on interband isolation, on gain and on the input VSWR.

Descriptors: *Microwave antennas, *Aircraft antennas, C band, Ku band, Dual channel, Polarization, Landing aids, Microwave equipment, Gain, Antenna radiation patterns

Identifiers: Microwave landing systems, NTISDODA

AD/A-002 043/8ST NTIS Prices: PC A06/MF A01

Compatibility Analysis of the Texas Instruments, ITT/Gilfillan, Bendix, and Hazeltine Microwave Landing System Proposals

IIT Research Inst Annapolis Md•Federal Aviation Administration, Washington, D.C.•Electromagnetic Compatibility Analysis Center, Annapolis, Md. (175300)

Final rept.
AUTHOR: Frazier, Robert A.
C3751C3 Fld: 17G, 85A, 76D GRAI7426
Jun 74 9p
Contract: F19628-73-C-0031, DOT-FA70WAI-175
Monitor: ECAC-PR-74-021

Abstract: The Texas Instruments Microwave Landing System (TI MLS) proposal was modeled in a 1980 high density environment. Its channel scheme and signal format were analyzed with the aid of a computer program to determine its adequacy in such a high density environment. Three other MLS proposals (ITT Gilfillan, Hazeltine, Bendix) were also examined. A comparison was made between the technical parameters of each and the parameters recommended by the Radio Technical Commission for Aeronautics Special Committee-117 (RTCA SC-117) to determine if the results of a previous analysis of the SC-117 MLS format could be applied to any of the three proposals. (Author)

Descriptors: •Landing aids, •Electromagnetic compatibility, Microwaves, Glide path systems, Instrument landings

Identifiers: •Microwave landing systems, NTISDODFAA, NTISDOT

AD-787 180/9SL NTIS Prices: PC A02/MF A01

In-Band Compatibility Analysis of the RTCA-Proposed Microwave Landing Guidance System (LGS) and Candidate Interim Systems

Electromagnetic Compatibility Analysis Center Annapolis Md (125350)

Final rept.
AUTHOR: Frazier, Robert A.
C0811C2 Fld: 17G, 51F GRAI7312
Jul 72 231p
Rept No: ECAC-PR-72-069
Contract: DOT-FA70WAI-175
Monitor: FAA-RD-72-62

Abstract: The electromagnetic compatibility among the proposed RTCA SC-117 next generation microwave landing guidance system (LGS) and several existing microwave landing guidance systems proposed as interim system candidates was analyzed. The signal format for LGS was developed by Special Committee 117 of the Radio Technical Commission for Aeronautics. The angle data localizer and glideslope portions of the systems were deployed in an FAA-predicted high density 1980 environment and the possibility of compatible operation was assessed with the assistance of a computer analysis. The compatibility among the systems' DME functions was nalyzed using frequency/distance considerations. The EMC between the landing guidance systems and other in-band domestic systems and between the LGS and a foreign microwave enroute guidance satellite system (DIOSCURES) were analyzed using frequency/distance considerations. (Author)

Descriptors: (•Air traffic control systems, Electromagnetic compatibility), Instrument landings, Microwave equipment, Distance-measuring equipment, Glide path systems, Radio equipment, Radio navigation

Identifiers: Microwave landing systems, Landing guidance systems, FAA

AD-759 145 NTIS Prices: PC A11/MF A01

A Comparison of the Frequency Requirements of an Earlier Design MLS and TRSB MLS

IIT Research Inst Annapolis Md (175300)

Final rept
AUTHOR: Gawthrop, Philip E.
E1284L1 Fld: 17G, 85A, 76D GRAI7814
Mar 76 27p
Contract: F19628-76-C-0017, DOT-FA70WAI-175
Project: 649E
Monitor: FAA/RD-77/108

Abstract: Channel assignments for an earlier design Microwave Landing System (MLS) and the Time Reference Scanning Beam (TRSB) MLS are compared. This comparison shows the advantages of the TRSB MLS signal format and channel plan over that of the earlier design system format and channel plan. This report considers the TRSB MLS design as it was at the time the study was completed. Since that time a number of design changes have been made and are not addressed in this report. (Author)

Descriptors: •Microwave landing systems, Electronic scanners, Electromagnetic compatibility, Instrument landings, Frequency allocation, Channels, Precision, Bandwidth, Formats, Microwave equipment, C band, Volume

Identifiers: Time reference scanning beam, Signal formats, NTISDODXA, NTISDOTFAA

AD-A052 364/7ST NTIS Prices: PC A03/MF A01

Microwave Landing System Intra-Aircraft EMC Analysis

Electromagnetic Compatibility Analysis Center Annapolis Md (125350)

Final rept.
AUTHOR: Gawthrop, Philip E.
E1154K1 Fld: 17G, 76D, 85A, 51E GRAI7813
Mar 76 46p
Rept No: ECAC-PR-76-006
Contract: DOT-FA70WAI-175
Monitor: FAA-RD-77-109

Abstract: This report discusses the electromagnetic compatibility of the Time-Reference Scanning-Beam Microwave Landing System (MLS) with other radiating systems on-board nine types of aircraft. These nine aircraft are the McDonnell Douglas DC-10, DC-9, DC-8, Boeing 747, 737, 727, 707, Lockheed Tristar L-1011, and the North American Rockwell T-39 Sabreliner. This MLS intra-aircraft interference analysis was performed by calculating the interference power level at a receiving antenna, comparing this power with a user-specified interference threshold, and identifying the potential problems. This report considers the TRSB MLS design as it was at the time the study was completed. Since that time a number of design changes have been made and are not addressed in this report. (Author)

Descriptors: *Landing aids, *Electromagnetic compatibility, *Avionics, Meteorological radar, Jet transport planes, Microwave equipment

Identifiers: *MLS(Microwave Landing System), DC-10 aircraft, DC-9 aircraft, 747 aircraft, 737 aircraft, 707 aircraft, Microwave landing systems, NTISDODXA, NTISDOTFAA

AD-A052 063/5ST NTIS Prices: PC A03/MF A01

The Development of Advanced Automatic Flare and Decrab for Powered Lift Short Haul Aircraft Using a Microwave Landing System

Lear Siegler, Inc., Los Angeles, Calif. Astronics Div.
AUTHOR: Gevaert, G.; Feinreich, B.
D2982L3 Fld: 01C, 1B, 17G, 51C, 51B, 76C STAR1514
Apr 77 278p
Rept No: NASA-CR-151948
Contract: NAS2-9068
Monitor: 18

Abstract: Advanced automatic flare and decrab control laws were developed for future powered lift STOL aircraft using the NASA-C-8A augmentor wing vehicle as the aircraft model. The longitudinal control laws utilize the throttle for flight path control and use the direct lift augmentor flap chokes for flight path augmentation. The elevator is used to control airspeed during the approach phase and to enhance path control during the flare. The forward slip maneuver was selected over the flat decrab technique for runway alignment because it can effectively handle the large crab angles obtained at STOL approach speeds. Performance evaluation of selected system configurations were obtained over the total landing environment. Limitations were defined and critical failure modes assessed. Pilot display concepts are discussed.

Descriptors: *Aircraft control, *Automatic landing control, *Microwave landing systems, *Short haul aircraft, Aircraft maneuvers, Aircraft safety, Flight paths, Lift augmentation, Systems engineering

Identifiers: NTISNASA

N77-23093/6ST NTIS Prices: PC A13/MF A01

Trials of the Doppler Microwave Landing System at London (Gatwick) Airport, August 1977

Royal Aircraft Establishment Farnborough (England)*Defence Research Information Centre, Orpington (England) (310450)

Technical rept.
AUTHOR: Gibson, P. L.
F1835G1 Fld: 17G, 1E, 85A GRAI7921
10 Oct 78 84p
Rept No: RAE-TR-78124
Monitor: DRIC-BR-66981

Abstract: This Report contains typical data collected from the trials at Gatwick and analysis of the results shows that the Doppler Microwave Landing System met the performance requirements at this airport for line of sight propagation paths. No specific technique-related effects were seen, and the results are regarded as typical of C band MLS performance at this airport. (Author)

Descriptors: *Microwave landing systems, Doppler systems, C band, Flight testing, Operational effectiveness, Great Britain, Instrument landings

Identifiers: Doppler microwave landing system, Gatwick Airport, London(England), NTISDODXA, NTISFNUK

AD-A069 783/9ST NTIS Prices: PC A05/MF A01

Trials of the Doppler Microwave Landing System at London (Gatwick) Airport, August 1977

Royal Aircraft Establishment, Farnborough (England)
AUTHOR: Gibson, P. L.
G0171F4 Fld: 17G, 85A STAR1723
Aug 77 83p
Rept No: RAE-TR-78124; BR66981
Monitor: 18
Subm-Sponsored by Min. Of Defence.

Abstract: The trials of the Doppler microwave landing (DMLS) at Gatwick formed part of a series conducted at operational airports to collect data for the ICAO evaluation program. Typical data collected from the trials at Gatwick and analysis of the results show that DMLS met the performance requirements at this airport for line of sight propagation paths. No specific technique related effects were seen and the results are regarded as typical of C band MLS performance at this airport.

Descriptors: *Microwave landing systems, Aircraft landing, Data acquisition, Doppler radar, Performance tests, Air traffic control, Aircraft safety, C band, Great britain, Instrument landing systems

Identifiers: NTISNASAE, NTISFNUK

N79-32194/9 NTIS Prices: PC A05/MF A01

Airborne Antenna Polarization Study for the Microwave Landing System

National Aeronautics and Space Administration, Langley Research Center, Langley Station, Va.
AUTHOR: Gilreath, M. C.
D1513D4 Fld: 17G, 9E, 85A, 76C, 49A STAR1502
1976 112p
Rept No: NASA-TM-X-73952
Monitor: 18
Misc-Original Contains Color Illustrations.

Abstract: The feasibility of the microwave landing system (MLS) airborne antenna pattern coverage requirements are investigated for a large commercial aircraft using a single omnidirectional antenna. Omnidirectional antennas having vertical and horizontal polarizations were evaluated at several different station locations on a one-eleventh scale model Boeing 737 aircraft. The results obtained during this experimental program are presented which include principal plane antenna patterns and complete volumetric coverage plots. (Author)

Descriptors: *Aircraft antennas, *Directional antennas, *Microwave landing systems, *Omnidirectional antennas, *Polarization characteristics, Antenna radiation patterns, Commercial aircraft, Feasibility analysis, Scale models

Identifiers: NTISNASA

N77-11266/2ST NTIS Prices: PC A06/MF A01

Preliminary Analysis of Several Microwave Landing System Flare Elevation Configurations

Avionics, Inc., Sunnyvale, Calif
AUTHOR: Goka, T.
C5114F1 Fld: 01B, 51B STAR1316
May 75 19p
Rept No: NASA-CR-137673
Contract: NAS2-8380
Monitor: 18

Abstract: Configurations of MLS Flare Elevation Systems that can be considered reasonable and practical in actual implementation are identified. Each of these are analyzed and compared with respect to (1) computational requirement, (2) required coverage, and (3) accuracy including altitude and sink-rate estimation error performance. (Author)

Descriptors: *Glide paths, *Microwave landing systems, Algorithms, Azimuth, Error analysis, Mathematical models, Range errors

Identifiers: NTISNASA

N75-24759/3ST NTIS Prices: PC A02/MF A01

Impact of FAA E and D Elements--Eight Airport Summary. Volume 8

Mitre Corp Mclean Va Metrek Div (409890)

Final rept.
AUTHOR: Haines, A. L.
E1691C2 Fld: 17G, 1E, 1B, 85A, 85D GRAI7817
Jan 78 71p
Rept No: MTR-7350-VOL-8
Contract: DOT-FA78WA-4075
Monitor: FAA-EM-78-4-VOL-8

Abstract: The potential benefits of implementing the products of selected FAA Engineering and Development Programs at eight major airports are surveyed. Best estimates of the expected performance of the Vortex Advisory/Wake Vortex Avoidance Systems (VAS/WVAS), Metering and Spacing (M and S--part of the ATC System Automation program) and the Discrete Address Beacon System are used as basis for estimating the increase in airport capacity that might be realized from the collective use of those systems in a pre-1985 case and a post-1985 case. Best estimates of the expected performance of the Airport Surface Traffic Control (ASTC) system, the Microwave Landing System (MLS), and Area Navigation Equipment (RNAV) plus results of recent FAA/TSC studies are used as the basis for estimating the individual impacts of those systems on controller workload, changes in air routes to reduce time and fuel, and ILS interference problems at the eight airports. This report summarizes the potential benefits. (Author)

Descriptors: *Air traffic control systems, *Air traffic control terminal areas, Airports, Airport radar systems, Discrete address beacon systems, Microwave landing systems, Wake, Trailing vortices, Collision avoidance, Instrument landings, Air traffic controllers, Flight paths, Scheduling, Fuel consumption, Terminal flight facilities

Identifiers: Vortex avoidance systems, Vortex advisory systems, NTISDODXA, NTISDOTFAA

AD-A054 245/6ST NTIS Prices: PC A04/MF A01

Development of a Digital Automatic Control Law for Steep Glideslope Capture and Flare

Virginia Univ., Charlottesville.

Final Report.
AUTHOR: Halyo, N.
D3173F3 Fld: 1B, 17G, 51B, 76A STAR1516
Jun 77 69p
Rept No: NASA-CR-2834
Contract: NAS1-12754

Monitor 18

Abstract: A longitudinal digital guidance and control law for steep glideslopes using MLS (Microwave Landing System) data is developed for CTOL aircraft using modern estimation and control techniques. The control law covers the final approach phases of glideslope capture, glideslope tracking, and flare to touchdown for automatic landings under adverse weather conditions. The control law uses a constant gain Kalman filter to process MLS and body-mounted accelerometer data to form estimates of flight path errors and wind velocities including wind shear. The flight path error estimates and wind estimates are used for feedback in generating control surface commands. Results of a digital simulation of the aircraft dynamics and the guidance and control law are presented for various wind conditions.

Descriptors: *Approach control, *Automatic control, *Glide paths, Optimal control, Digital navigation, Kalman filters, Microwave landing systems, Runway lights

Identifiers: NTISNASA

N77-25149/4ST NTIS Prices: PC A04/MF A01

Development of a Digital Guidance and Control Law for Steep Approach Automatic Landings Using Modern Control Techniques

Analytical Mechanics Associates, Inc., Hampton, VA.

Final Report.
AUTHOR: Halyo, N.
F0983B1 Fld: 17G, 1D, 1B, 85A, 51B STAR1708
Feb 79 72p
Rept No: NASA-CR-3074; AMA-NO-77-24
Contract: NAS1-14088
Monitor: 18

Abstract: The development of a digital automatic control law for a small jet transport to perform a steep final approach in automatic landings is reported, along with the development of a steady-state Kalman filter used to provide smooth estimates to the control law. The control law performs the functions of localizer and glides capture, localizer and glideslope track, decrab, and place. The control law uses the microwave landing system position data, and aircraft body-mounted accelerators, attitude and attitude rate information. The results obtained from a digital simulation of the aircraft dynamics, wind conditions, and sensor noises using the control law and filter developed are described.

Descriptors: *Aircraft guidance, *Automatic landing control, *Control theory, Digital techniques, Digital simulation, Kalman filters, Microwave landing systems, Transport aircraft

Identifiers: NTISNASA

N79-16824/1ST NTIS Prices: PC A04/MF A01

Development of an Optimal Automatic Control Law and Filter Algorithm for Steep Glideslope Capture and Glideslope Tracking

Virginia Univ., Charlottesville.

Final Report.
AUTHOR: Halyo, N.
C7741B2 Fld: 17G, 1C, 76C STAR1420
Aug 76 94p
Rept No: NASA-CR-2720
Contract: NAS1-10210
Monitor: 18

Abstract: A digital automatic control law to capture a steep glideslope and track the glideslope to a specified altitude is developed for the longitudinal/vertical dynamics of a CTOL aircraft using modern estimation and control techniques. The control law uses a constant gain Kalman filter to process guidance information from the microwave landing system, and acceleration from body mounted accelerometer data. The filter outputs navigation data and wind velocity estimates which are used in controlling the aircraft. Results from a digital simulation of the aircraft dynamics and the control law are presented for various wind conditions. (Author)

Descriptors: *Approach control, *Automatic landing control, *Glide paths, Optimal control, Kalman filters, Microwave landing systems, Navigation aids, Noise reduction, Tracking (Position), Wind velocity

Identifiers: NTISNASA

N76-29160/8ST NTIS Prices: PC A05/MF A01

Multiple Curved Descending Approaches and the Air Traffic Control Problem

National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
AUTHOR: Hart, S. G.; McPherson, D.; Kreifeldt, J.; Wemple, T. E.
E0181B2 Fld: 17G, 18, 76C, 85A, 51B STAR1523
Aug 77 20p
Rept No: NASA-TM-78430; A-7151
Contract: NGL-05-046-002
Monitor: 18

Abstract: A terminal area air traffic control simulation was designed to study ways of accommodating increased air traffic density. The concepts that were investigated assumed the availability of the microwave landing system and data link and included: (1) multiple curved descending final approaches; (2) parallel runways certified for independent and simultaneous operation under IFR conditions; (3) closer spacing between successive aircraft; and (4) a distributed management system between the air and ground. Three groups each consisting of three pilots and two air traffic controllers flew a combined total of 350 approaches. Piloted simulators were supplied with computer generated traffic situation displays and flight instruments. The controllers were supplied with a terminal area map and digital status information. Pilots and controllers also reported that the distributed management procedure was somewhat more safe and orderly than the centralized management procedure. Flying precision increased as the amount of turn required to intersect the outer mark decreased. Pilots reported that they preferred the alternative of multiple curved descending approaches with wider spacing between aircraft to closer spacing on single, straight in finals while controllers preferred the latter option. Both pilots and controllers felt that parallel runways are an acceptable way to accommodate increased traffic density safely and expeditiously.

Descriptors: *Air traffic control, *Aircraft landing, *Approach control, *Landing aids, *Microwave landing systems, Air traffic controllers (Personnel), Aircraft safety, Data links, Flight simulators, Runways

Identifiers: NTISNASA

N77-32104/0ST NTIS Prices: PC A02/MF A01

An Avionics Sensitivity Study. Volume 2: Evaluation of Airborne Navigation System Performance During Rnav/Mls Transition

Systems Control, Inc., Palo Alto, Calif.
Final Report, Aug. 1975 - Sep. 1976.
AUTHOR: Heine, W.
D3082F4 Fld: 17G, 18, 51E, 51B, 85A STAR1515
Sep 76 115p
Rept No: NASA-CR-145108
Contract: NAS1-14144
Monitor: 18

Abstract: A computer simulation was modified to generate a suitable data base for performance of an avionics sensitivity study during RNAV/MLS transition. The avionics sensitivity data provides information necessary to establish requirements for additional guidance law design during transition and to establish airspace requirements for maneuvering to null out any residual RNAV errors upon MLS transition. The data base is also beneficial as planning information for subsequent flight testing.

Descriptors: *Airborne equipment, *Area navigation, *Avionics, *Microwave landing systems, Computerized simulation, Data bases, Error analysis, Sensitivity, Transient response

Identifiers: NTISNASA

N77-24083/6ST NTIS Prices: PC A06/MF A01

STOL Aircraft Instrument Landing System

Epsco Inc Westwood Mass (131200)

Final rept.
AUTHOR: Hills, Robert S.
A2471F1 Fld. 17G, 51F GRAI7116
Feb 71 66p*
Contract: DOT-FA69WA-2098
Project: FAA-320-114-02N
Monitor: FAA-RD-71-17

Abstract: The report describes the development of a Microwave Scanning Beam Instrument Landing System for STOL aircraft and airports (MODILS). It is a flexible system meeting or exceeding Category I requirements with a growth potential for handling all types of aircraft in Categories II and III by modular additions. In azimuth it provides plus or minus 0.5 degree accuracy with pilot selected course width between plus or minus 2 degrees and plus or minus 10 degrees within a 60 degree course sector. A left or right skew course, as well as a centerline course is selectable. In elevation it provides plus or minus 0.1 degree accuracy of a pilot selected glide slope between 3 degrees and 12 degrees and path width of plus or minus 1 to plus or minus 5 degrees. Integral DME functions are provided with an accuracy of plus or minus 0.01 nautical miles plus or minus 1% of range to a range of approximately 10 nautical miles. The ground station is entirely dualistic except for antennas. Switch-over from main to standby equipment is controlled by integral dual monitor units operating in parallel. (Author)

Descriptors: (*Instrument landings, *Microwave equipment), (*Short take-off planes, Instrument landings), Radio scanning, Airports, Azimuth, Glide path systems, Distance-measuring equipment

Identifiers: MODILS(Modular Microwave Instrument Landing Systems), *Modular microwave instrument landing systems

AD-725 705 NTIS Prices: PC A04/MF A01

Improvement of Standard ILS While Retaining Compatibility Verbesserung des Standard-ILS Unter Beibehaltung der Kompatibilitaet

Standard Electrik Lorenz A.G., Stuttgart (West Germany). Erzeugnisgebiet Navigation.
AUTHOR: Hoefgen, G.
C2065E1 Fld: 1B STAR1123
1973 7p
Rept No: DGLR-PAPER-73-018
Monitor: 18
Conf-Presented at the Dglr-Dgon Symp. On Neue Anflug- und Landeverfahren, Duesseldorf, 2-4 May 1973.
Language in German.

Abstract: Two methods of improving the standard instrument landing system, while retaining compatibility, are presented. The compatible instrument landing system (CILS) consists of the following components: (1) standard ILS for clearance, and (2) microwave ILS 5 GHz, based on conventional priciple (90/150 Hz) only for approach sector. To be compatible with the existing two carrier systems with 9 kHz difference carrier frequency, the microwave oscillator frequency is also radiated. The precision instrument landing system (PILS), necessitates more onboard equipment and includes linear antenna arrays, consisting of elements sequentially radiating signals An advantage over standard ILS is that the glide angle can be selected at random onboard.

Descriptors: *Aircraft landing, *Approach control, *Instrument landing systems, Antenna arrays, Compatibility, Glide paths, Microwave frequencies, Onboard equipment

Identifiers: NASA

N73-32524/3 NTIS Prices: PC A02/MF A01

The Measurement of Microwave Multipath in an Airport Environment

Office of Telecommunications Boulder Colo Inst for Telecommunication Sciences (406445)

Final rept.
AUTHOR: Hubbard, R. W.; Pratt, L. E.; Hartman, W. J.
D2142F4 Fld: 17G, 20N, 85A, 46H, 76D GRAI7712
Jan 77 74p
Contract: DOT-FA74WAI-471
Monitor: FAA-RD-76-163

Abstract: Multipath in an operating airport, and its impact on the performance of a Microwave Landing System (MLS) is an important aspect of the development of these systems. Test programs on the candidate MLS systems developed in the U.S. were conducted in areas that do not emulate large commercial airports. In order to better evaluate multipath in a realistic environment, measurements of reflected signals at the MLS operating frequency were performed, and the results used to develop or modify a computer simulation program. Both a cw system and a pseudorandom noise (PN) channel probe were used in the measurement program. This report presents the results of multipath measurements made on (1) airport terminal buildings, (2) large maintenance hangars, and (3) aircraft on the surface of the airport. Results indicate that significant reflection levels are prevalent from these sources, and could produce a multipath reception problem at the receiver of an aircraft approaching the runway. (Author)

Descriptors: *Microwave landing systems, *Multipath transmission, Airports, Microwave receivers, Microwave transmission, Antenna radiation patterns, Channels, Pseudo noise systems, Response, Microwave equipment

Identifiers: Time delay, NTISD0DXA

AD-A037 791/1ST NTIS Prices: PC A04/MF A01

Optimal Control Aircraft Landing Analysis

Air Force Flight Dynamics Lab Wright-Patterson AFB Ohio (012070)

Technical rept. Jan 72-Jul 73
AUTHOR: Huber, Robert E. Jr
C2655J4 Fld: 1B, 1E, 51B, 76A GRAI7411
Dec 73 136p
Rept No: AFFDL-TR-73-141
Monitor: 18

Abstract: A digital computer analysis technique was developed to predict aircraft longitudinal landing performance to touchdown. A microwave landing system provided sampled data elevation angle guidance and assumed continuous DME (distance measuring equipment) information. The linearized longitudinal equations for perturbations about trimmed flight were used for the aircraft model. Atmospheric disturbances including deterministic winds and random gusts were modeled. The deterministic gusts included headwinds and wind shears. The random gusts included longitudinal and normal gusts which were modeled as first order Gauss Markov processes. The microwave landing system noise was also included. (Modified author abstract)

Descriptors: *Aircraft landings, *Landing aids, *Microwave equipment, *Automatic pilots, Computer applications, Mathematical prediction, Performance(Engineering), Visibility, Trajectories, Optimization, Statistical analysis, Mathematical models, Atmospheres, Noise(Electrical and electromagnetic)

Identifiers: *Microwave landing systems, AF

AD-776 316/2 NTIS Prices: PC A07/MF A01

A Scoring System for the Quantitative Evaluation of Pilot Performance During Microwave Landing System (MLS) Approaches

Aeronautical Systems Div Wright-Patterson AFB Ohio (008800)

Interim technical rept. Oct 74-Jan 75
AUTHOR: Hyatt, Christopher J.; DeBerg, Oak H.
C679414 Fld: 51, 1B, 92B, 51B GRAI7616
Aug 75 22p
Rept No: ASD-TR-75-17
Monitor: 18
See also report dated Jul 74, AD-A000 422.

Abstract: The Crew Station Design Facility's scoring system for ILS approaches and landings has been extended for use with Microwave Landing System (MLS) approaches. The philosophy of scoring systems is briefly discussed, and the rationale for this application is developed.

Descriptors: *Performance(Human), *Pilots, *Aircraft landings, Microwave landing systems, Assessment, Approach, Technology transfer, Computerized simulation, Time, Flight paths, Equations, Methodology

Identifiers: *Scoring systems, NTISD0DAF

AD-A025 782/4ST NTIS Prices: PC A02/MF A01

Benefits of MLS Guidance for Curved Approaches. Volume II. Operational Benefits for New York Airports

MITRE Corp., McLean, Va. METREK Div.*Federal Aviation Administration, Washington, D.C. Office of Systems Engineering Management.

Technical rept.
AUTHOR: Iyer, R. R.
E0335D1 Fld: 1B, 17B, 17G, 51B, 68B, 85A GRAI7804
Jul 75 52p
Rept No: MTR-6951-Vol-2
Contract: DOT-FA70WA-2448
Monitor: 1B

Abstract: Projected benefits of curved approaches during marginal VFR and IFR weather conditions provided by implementing MLS at LaGuardia and Kennedy are investigated. It is shown that the operational flexibility due to MLS contributes the following benefits: increases in capacity at LGA during IFR and marginal VFR conditions, reductions in airport noise exposure over populated areas around JFK and LGA, reductions in NASCOM delays at LGA and savings in operating costs for airlines by terminal route reductions.

Descriptors: *Aircraft landings, *Microwave communication, Approach, Noise reduction, Benefit cost analysis, Flight paths, Air traffic control

Identifiers: LaGuardia Airport, *Microwave landing systems, *Instrument flight rules, *Visual flight rules, Curved approaches, John F. Kennedy International Airport, NTISMITRE, NTISDOTFAA

PB-274 585/9ST NTIS Prices: PC A04/MF A01

Microwave Landing System Accuracy Requirements for Automatic Flare-Out

Royal Aircraft Establishment Farnborough (England) (310450)

Technical memo.
AUTHOR: James, P. W.
D1135L1 Fld: 1B, 17G, 9B, 85A GRAI7705
Mar 76 39p
Rept No: RAE-TM-Rad-Nav-32
Monitor: DRIC-BR-52294

Abstract: The report describes adaptation of a computer based simulation of a transport aircraft automatic landing system to enable study of microwave landing system (MLS) flare guidance. The simulation was used to examine the allowable errors from the range and elevation angle measuring sub-systems of the MLS flare system. (Author)

Descriptors: *Microwave landing systems, *Flareout, *Computerized simulation, Elevation, Transport aircraft, Errors, Great Britain, Automatic, Accuracy, Distance measuring equipment, Mathematical analysis, Sensitivity, Elevators

Identifiers: NTISDODXA

AD-A033 372/4ST NTIS Prices: PC A03/MF A01

Contributions to the UK Microwave Landing System Research and Development Programme 1974 to 1978. Volume 3

Royal Aircraft Establishment Farnborough (England)*Defence Research Information Centre, Orpington (England) (310450)

Technical rept.
AUTHOR: Jones, J. M.
G1901L3 Fld: 17G, 85A GRAI8020
May 79 238p
Rept No: RAE-TR-79052-VOL-3
Monitor: DRIC-BR-73763
See also Volume 1, AD-A085 478.
Availability: Microfiche copies only.

Abstract: For abstract see AD-A085 478.

Descriptors: *Microwave landing systems, *Doppler systems, *Landing aids, *All weather aviation, Multiplexing, Hybrid simulation, Flight testing, Systems analysis, C band, Performance(Engineering)

Identifiers: *Foreign Technology, DMLS(Doppler Microwave Landing System), Time division multiplexing, Ground testing, Frequency division multiplexing, NTISDODXA, NTISFNUK

AD-A085 480/2 NTIS Prices: MF A01

Contributions to the UK Microwave Landing System Research and Development Programme 1974 to 1978. Volume 1

Royal Aircraft Establishment Farnborough (England)*Defence Research Information Centre, Orpington (England) (310450)

Technical rept.
AUTHOR: Jones, J. M.
G1901L1 Fld: 17G, 85A GRAI8020
May 79 242p
Rept No: RAE-TR-79052-VOL-1
Monitor: DRIC-BR-73155
See also Volume 2, AD-A085 479

Abstract: In support of the UK MLS programme, Doppler Microwave Landing System (DMLS) equipment operating on both frequency division and time division multiplex formats has been extensively evaluated by means of analysis, ground and flight tests and hybrid simulation. The results of this programme have shown that the use of the Doppler technique leads to simple and reliable equipment with performance well inside the operational requirements. In particular, a full understanding of the possible environmental effects on system performance at 5 GHz has been obtained. (Author)

Descriptors: *Microwave landing systems, *Doppler systems, *Landing aids, *All weather aviation, Multiplexing, Flight testing, Hybrid simulation, Systems analysis, C band, Performance(Engineering)

Identifiers: *Foreign Technology, DMLS(Doppler Microwave Landing System), Time division multiplexing, Frequency division multiplexing, Ground testing, NTISDODXA, NTISFNUK

AD-A085 478/6 NTIS Prices: PC A11/MF A01

Contributions to the UK Microwave Landing System Research and Development Programme 1974 to 1978. Volume 2

Royal Aircraft Establishment Farnborough (England)*Defence Research Information Centre, Orpington (England) (310450)

Technical rept.
AUTHOR: Jones, J. M.
G1901L2 Fld: 17G, 85A GRAI8020
May 79 68p
Rept No: RAE-TR-79052-VOL-2
Monitor: DRIC-BR-73762
See also Volume 3, AD-A085 480.
Availability: Microfiche copies only.

Abstract: For abstract see AD-A085 478.

Descriptors: *Microwave landing systems, *Doppler systems, *Landing aids, *All weather aviation, Multiplexing, Hybrid simulation, Flight testing, Systems analysis, C band, Performance(Engineering)

Identifiers: *Foreign Technology, DMLS(Doppler Microwave Landing System), Time division multiplexing, Ground testing, Frequency division multiplexing, NTISDODXA, NTISFNUK

AD-A085 479/4 NTIS Prices: MF A01

Microwave Scanning Beam Approach and Landing System Phased Array Antenna

Transportation Systems Center Cambridge Mass (407082)

Annual rept Jul 70-Jul 71
AUTHOR Kalafus, R. M.; Harris, P.; Larussa, F. J.; Bishop, G J.; Pantano, P. J.
A3842H2 Fld. 17G, 9E, 51F, 66A GRAI7208
Sep 71 314p
Rept No: TSC-FAA-71-29
Monitor: FAA-RD-71-87

Abstract: The feasibility of the use of phased arrays for the proposed microwave landing guidance system (MLGS) is discussed. The effects of the use of planar and conical beam guidance on the choice of system configurations is investigated. The design of an experimental antenna to demonstrate feasibility is given. (Author)

Descriptors: (*Glide path systems, *Antenna arrays), (*Commercial planes, Instrument landings), Approach, Phased arrays, Microwave equipment, Antenna feeds, Networks, Radiofrequency power, Lens antennas

Identifiers: *Microwave landing guidance systems, MLGS(Microwave Landing Guidance Systems)

AD-737 511 NTIS Prices: PC A14/MF A01

Microwave Scanning Beam Approach and Landing System Phased Array Antenna. Volume II

Transportation Systems Center Cambridge Mass (407082)

Annual rept. no. 2, Jul 71-Jun 72
AUTHOR: Kalafus, R. M.; Bishop, G. J.; LaRussa, F. J.; Pantano, P. J.; Wade, W. R.
C0805C4 Fld: 17G, 9E, 85*, 66A, 51F GRAI7312
Feb 73 205p
Rept No: TSC-FAA-72-41-Vol-2
Contract: DOT-PPA-FA-209
Monitor: FAA-RD-72-128-Vol-2
See also Volume 1, AD-759 097.

Abstract: :Contents: Evaluation of an R-2R lens as a component in a C-Band phased array; Azimuth component specifications and test results; Elevation component specifications.

Descriptors: (*Phased arrays, Reliability(Electronics)), (*Landing aids, Phased arrays), (*Air traffic control systems, *Microwave equipment), Glide path systems, Antenna components, C band, Phase shifters, Power dividers, Electromagnetic lenses, Specifications

Identifiers: *Microwave landing systems, Azimuth scanning antennas, Near field effect, FAA

AD-759 098 NTIS Prices: PC A10/MF A01

Microwave Scanning Beam Approach and Landing System Phased Array Antenna. Volume I

Transportation Systems Center Cambridge Mass (407082)

Annual rept. no. 2, Jul 71-Jun 72
AUTHOR: Kalafus, R. M.; Bishop, G. J.; LaRussa, F. J.; Pantano, P. J.; Wade, W. R.
C0805C3 Fld: 17G, 9E, 85A*, 66A, 51F GRAI7312
Feb 73 241p*
Rept No: TSC-FAA-72-41-Vol-1
Contract: DOT-PPA-FA-209
Monitor: FAA-RD-72-128-Vol-1
See also Volume 2, AD-759 098.

Abstract: The use of phased arrays for the proposed landing system (MLS) is discussed. Studies relating to ground reflections, near field focusing, and phased-array errors are presented. Two experimental antennas which were fabricated and tested are described. Complete component specifications as well as test results are included. (Author Modified Abstract)

Descriptors: (*Phased arrays, Reliability(Electronics)), (*Landing aids, Phased arrays), (*Air traffic control systems, *Microwave equipment), Glide path systems, Antenna components, C band, Phase shifters, Power dividers, Electromagnetic lenses, Antenna radiation patterns, Specifications

Identifiers: *Microwave landing systems, Azimuth scanning antennas, Near field effects, FAA

AD-759 097 NTIS Prices: PC A11/MF A01

Microwave Scanning Beam Approach and Landing System Phased Array Antenna

Transportation Systems Center Cambridge Mass (407082)

Annual rept. no. 3, Jul 72-Mar 73
AUTHOR: Kalafus, R. M.; Bishop, G. J.; LaRussa, F. J.; Pantano, P. J.; Spangler, D.
C3314A3 Fld: 17G, 9E, 49A, 76C, 85A GRAI7420
May 74 174p
Rept No: TSC-FAA-74-9
Monitor: FAA-RD-74-59
See also report dated Feb 73, AD-759 097

Abstract: The design, operating instructions, detailed logic circuitry, and antenna test range results for the electronic circular scanning phased array developed at TSC (DOTSCAN) are described. Components develop- ' for this effort are also described, and test results giver (Author)

Descriptors: *Air traffic control systems, *Landing aids, *Microwave antennas, Phased arrays, Microwave equipment, Beam steering, C band, Digital computers, Computer programming

Identifiers NTISDOT, *Microwave landing systems, *Azimuth scanning antennas, Beam steering computers, NTISDODFAA

AD-782 860/1 NTIS Prices: PC A08/MF A01

An Avionics Sensitivity Study. Volume 3: Automated RNAV/MLS Transition

Systems Control, Inc., Palo Alto, Calif.
AUTHOR: Karmarkar, J. S.
D3082G1 Fld: 17G, 1B, 51E, 51B, 85A STAR1515
Mar 77 36p
Rept No: NASA-CR-145109
Contract: NAS1-14144
Monitor: 1B

Abstract: An automated algorithm for transitioning from RNAV to MLS is described. The algorithm generates guidance commands to enable the pilot to automatically switch from RNAV to MLS and effectively correct any offset errors during this transition. Software/hardware implementation details pertinent to the TCV Boeing 737 avionics are also considered.

Descriptors: *Area navigation, *Avionics, *Microwave landing systems, *Navigation aids, Air navigation, Algorithms, Automatic landing control, Command guidance, Real time operation

Identifiers: NTISNASA

N77-24084/4ST NTIS Prices PC A03/MF A01

Organization and Use of a Software/Hardware Avionics Research Program (SHARP)

Systems Control, Inc., Palo Alto, Calif.
AUTHOR: Karmarkar, J. S.; Kareemi, M. N.
C6394I1 Fld: 01C, 09B, 51C STAR1407
Jul 75 110p
Rept No: NASA-CR-137676
Contract: NAS2-8344
Monitor: 1B

Abstract: The organization and use is described of the software/hardware avionics research program (SHARP) developed to duplicate the automatic portion of the STOLAND simulator system, on a general-purpose computer system (i.e., IBM 360). The program's uses are: (1) to conduct comparative evaluation studies of current and proposed airborne and ground system concepts via single run or Monte Carlo simulation techniques, and (2) to provide a software tool for efficient algorithm evaluation and development for the STOLAND avionics computer. (Author)

Descriptors: *Avionics, *Cockpit simulators, *Computer programs, *Short takeoff aircraft, Aircraft landing, Algorithms, Computerized simulation, Microwave landing systems, Monte carlo method

Identifiers: STOLAND system, NTISNASA

N76-16062/1ST NTIS Prices: PC A06/MF A01

Analytical Evaluation of Ilm Sensors. Volume 2: Appendices

Honeywell, Inc., Minneapolis, Minn. Systems and Research Center.
AUTHOR: Kirk, R. J.
C5555F1 Fld 01E STAR1322
Sep 75 112p
Rept No: NASA-CR-132687-VOL-2
Contract NAS1-13489
Monitor: 1B

Abstract: The applicability of various sensing concepts to independent landing monitor systems was analyzed. Microwave landing system MLS accuracy requirements are presented along with a description of MLS airborne equipment. Computer programs developed during the analysis are described and include: a mathematical computer model for use in the performance assessment of reconnaissance sensor systems; a theoretical formulation of electromagnetic scattering to generate data at high incidence angles; atmospheric attenuation of microwaves; and mic owave radiometry, programs

Descriptors: *Aircraft landing, *Automatic landing control, *Landing aids, *Remote sensors, Computer programs, Interferometry, Microwave landing systems, Microwave radiometers, Radar

Identifiers: NTISNASA

N75-31046/6ST NTIS Prices: PC A06/MF A01

Analytical Evaluation of Ilm Sensors, Volume 1

Honeywell, Inc., Minneapolis, Minn. Systems and Research Center.

Final Report.
AUTHOR: Kirk, R. J.
C5555E4 Fld: 01B, 01E, 51B, 76C STAR1322
Sep 75 527p
Rept No: NASA-CR-132687-VOL-1; F-2132-VOL-1
Contract: NAS1-13489
Monitor: 18

Abstract: The functional requirements and operating environment constraints are defined for an independent landing monitor ILM which provides the flight crew with an independent assessment of the operation of the primary automatic landing system. The capabilities of radars, TV, forward looking infrared radiometers, multilateration, microwave radiometers, interferometers, and nuclear sensing concepts to meet the ILM conditions are analyzed. The most critical need for the ILM appears in the landing sequence from 1000 to 2000 meters from threshold through rollout. Of the sensing concepts analyzed, the following show potential of becoming feasible ILM's: redundant microwave landings systems, precision approach radar, airborne triangulation radar, multilateration with radar altimetry, and nuclear sensing. (Author)

Descriptors: *Aircraft landing, *Automatic landing control, *Landing aids, *Remote sensors, Interferometry, Microwave landing systems, Microwave radiometers, Radar

Identifiers: NTISNASA

N75-31045/8ST NTIS Prices: PC A23/MF A01

Algorithms and Logic for Incorporating MLS Back Azimuth Information into the NASA TCV B-737 Airplane Area Navigation System

National Aeronautics and Space Administration, Langley Research Center, Hampton, VA.
AUTHOR: Knox, C. E.
F1101I1 Fld: 17G, 76D STAR1709
Jan 79 21p
Rept No: NASA-TM-80039
Monitor: 18

Abstract: Navigation position estimates are based on range information form a randomly located DME and MLS back azimuth angular information. The MLS volmetric coverage checks are performed to ensure that proper navigation inputs are being utilized. These algorithms and volumetric checks were designed so that they could be added to most existing area navigation systems with minimum software modification

Descriptors: *Air navigation, *Boeing 737 aircraft, *Microwave landing systems, NASA programs, Terminal configured vehicle program, Algorithms, Azimuth, Distance measuring equipment, Error analysis, Estimates, Logic design, Rangefinding, Signal processing, Volumetric analysis

Identifiers: Area navigation systems, NTISNASA

N79-17843/0ST NTIS Prices: PC A02/MF A01

Experimental Determination of Position-Estimate Accuracy Using Back-Azimuth Signals from a Microwave Landing System

National Aeronautics and Space Administration, Langley Research Center, Hampton, Va
AUTHOR: Knox, C. E.
G0522J3 Fld: 17G, 85A, 76D STAR1804
Dec 79 37p
Rept No: NASA-TP-1574; L-13074
Monitor: 18

Abstract: Flight tests using the Boeing 737 airplane to obtain position estimates with back azimuth signals from a microwave landing system (MLS) are discussed. The equations and logic used to generate a navigation position estimate in the MLS back azimuth signal environment are described. The error in the navigation position estimate is determined. A summary of the Boeing 737 position estimate update process is described. The navigation position estimate error, calculated flight data and radar tracking information is analyzed. The position estimate error data using the MLS inputs are compared with error data obtained during dual distance measuring equipment updates.

Descriptors: *Microwave landing systems, *Navigation aids, *Position (Location), Bearing (Direction), Boeing 737 aircraft, Error analysis, Flight tests

Identifiers: Radio navigation, NTISNASA

N80-13020/6 NTIS Prices: PC A03/MF A01

Experimental Determination of Position-Estimate Accuracy Using Back-Azimuth Signals from a Microwave Landing System

National Aeronautics and Space Administration Langley Station VA Langley Research Center*National Aeronautics and Space Administration, Washington, DC (387543)

Technical paper
AUTHOR: Knox, Charles E.
G0565H1 Fld: 17G, 85A, 76D GRAI8008
Dec 79 37p
Rept No: NASA-L-13074
Monitor: NASA-TP-1574

Abstract: This paper presents the results of flight tests using the NASA Terminal Configured Vehicle (TCV) Boeing 737 airplane to obtain position estimates with back-azimuth signals from a microwave landing system. The most accurate position estimates were obtained from a combination of back-azimuth and distance-measuring-equipment (DME) signals. Less accurate position estimates were obtained with back-azimuth signals alone; the least accurate position estimates were obtained with dual DME signals. (Author)

Descriptors: *Position finding, *Microwave landing systems, Aircraft landings, Approach, Radio navigation, Distance measuring equipment, Azimuth, Radio signals, Estimates

Identifiers: Back azimuth signals, NTISDODXA, NTISNASA

AD-A078 614/5 NTIS Prices: PC A03/MF A01

Accurate Surveillance in the Terminal Area

Transportation Systems Center Cambridge Mass (407082)

Final rept.
AUTHOR: Kulke, B.; Minkoff, R. T.; Haroules, G. G.
A5355G1 Fld: 17G, 1B, 51F, 51G GRAI7223
Sep 71 41p
Rept No: TSC-FAA-71-26
Monitor: 18

Abstract: The problem of deriving surveillance information from the MLS has been analyzed in terms of the available air-to-ground communication links. The results of this study indicate that the use of this approach is feasible and it is recommended that the configuration based on the DABS data link be included in the upgraded third-generation design to meet the high-density terminal-area surveillance requirements. (Author)

Descriptors: (*Air traffic control systems, *Position finding), (*Air traffic control terminal areas, Aviation safety), Civil aviation, Radar beacons, Distance-measuring equipment, Data transmission systems

Identifiers: *Microwave landing systems, DABS(Discrete Address Beacon Systems), Discrete address beacon systems

AD-749 907 NTIS Prices: PC A03/MF A01

An Investigation of Microwave Landing Guidance System Signal Requirements for Conventionally Equipped Civilian Aircraft

Transportation Systems Center Cambridge Mass (407082)

Technical rept
AUTHOR Lanman, Maurice H. III
A3773L1 Fld 17G, 1B, 51F GRAI7207
Jun 71 189p
Rept No DOT-TSC-FAA-71-24
Monitor: FAA-RD-71-86

Abstract: The report describes efforts leading to the determination of minimum suitable scan rates for the azimuth and Elevation functions of the microwave Landing Guidance System (LGS) proposed by RTCA SC-117, based on performance requirements of two conventionally equipped civilian aircraft. Two complementary methods are used; one involving a full nonlinear digital simulation, the other involving direct covariance matrix propagation. Wind and turbulence models, aircraft models and LGS models are described in detail. (Author)

Descriptors: (*Glide path systems, Microwave frequency), Instrument landings, Scanning, Mathematical analysis

Identifiers: Microwave landing systems, Digital simulation

AD-737 339 NTIS Prices: PC A09/MF A01

Microwave Landing System Signal Requirements for Conventional Aircraft

Transportation Systems Center Cambridge Mass (407082)

Final rept. 1971-72
AUTHOR: Lanman, Maurice H. III
C0383C2 Fld: 17G, 51F GRAI7306
Jul 72 140p*
Rept No: TSC-FAA-72-30
Monitor: FAA-RD-72-86

Abstract: The results of analysis directed towards determining Microwave Landing System (MLS) signal requirements for conventional aircraft are discussed. The phases of flight considered include straight-in final approach, flareout, and rollout. A limited number of detailed problems in performance analysis are studied. Data from computer simulation, covariance propagation and system optimization, with a careful selection of variables provides a means for generalizing from the results of specific experiments to more comprehensive functional, data rate, beam noise, and control system requirements for automatic landing in turbulence. (Author)

Descriptors: (*Air traffic control systems, Instrument landings), All-weather aviation, Landing aids, Automatic, Mathematical models, Optimization, Jet planes

Identifiers: *Microwave landing systems

AD-754 892 NTIS Prices: PC A07/MF A01

An Experimental Investigation of Control-Display Requirements for a Jet-Lift VTOL Aircraft in the Terminal Area

Calspan Corp Buffalo NY•Naval Air Development Center, Warminster, PA (407727)

Final rept. Jun 76-Jul 78
AUTHOR: Lebacqz, J. V.; Radford, R. C.; Beilman, J. L.
F1722D3 Fld: 1C, 1B, 1D, 51C, 51B, 51E GRAI7920
Jul 78 397p
Rept No: CALSPAN-AK-5985-F-1
Contract: N62269-76-C-0370
Monitor: NADC-76099-60

Abstract: The fourth flight research program using the variable stability, variable display X-22A VTOL research aircraft was undertaken with the objective of expanding the operational capability of VTOL aircraft under adverse weather conditions. The experiment investigated a matrix of control, display and task variables for the landing approach task in a ground simulation phase followed by an in-flight simulation phase. Aerodynamic characteristics of the McDonnell-Douglas AV-8B Advanced Harrier were simulated for a prescribed decelerating approach profile using the X-22A's variable stability system; around this simulation, an analog of the AV-8B control system was implemented to investigate a range of realizable control system designs. Combinations of these control concepts and a variety of head-up display formats and information levels were evaluated in fight for simulated instrument approaches.

Descriptors: •Vertical takeoff aircraft, •Vertical landing, •Flight control systems, Variable stability aircraft, Research aircraft, Microwave landing systems, Approach, Instrument landings, Terminal guidance, Aerodynamic stability, Stability, Adverse conditions, All weather aviation, Head up displays, Flight simulation

Identifiers: V-8 aircraft, AV-8B aircraft, X-22 aircraft, X-22A aircraft, NTISDODXA, NTISDODN

AD-A068 818/4ST NTIS Prices: PC A17/MF A01

SSILS Initial Evaluation Report. Myrtle Beach AFB, South Carolina

Facility Checking Squadron (1866th) (AFCS) Scott AFB IL (40882?)

Final rept.
AUTHOR: Leister, Harvey J.
G0812B2 Fld: 1E, 17G, 85A GRAI8011
26 Oct 79 125p
Rept No: 79/66N-191

Abstract: This report presents the results of the 15-26 October 1979 TRACALS Evaluation of the Evaluation of the Myrtle Beach AN/GRN-29 SSILS serving Runway 17. The evaluation was conducted to determine the capabilities and limitations of the system in its installed environment. Results presented in this report can be usedas a guide to anticipated performance until there is a significant change in ground equipment, siting environment, screening or operational use. (Author)

Descriptors: •Microwave landing systems, •Instrument landings, Air traffic control systems, Glide slope, Air force facilities, Airports, Test and evaluation, South Carolina

Identifiers: Tracals project, •AN/GRN-29, Myrtle Beach Air Force Base, NTISDODXA

AD-A080 619/0 NTIS Prices: PC A06/MF A01

TRACALS Evaluation Report. Special Evaluation Report QOT and E of the AN/GRN-29(V) SSILS, Wright-Patterson AFB, Ohio, 10-19 April 1979

Facility Checking Squadron (1866th) (AFCS) Scott AFB IL (40882?)

Final rept.
AUTHOR: Leister, Harvey J.
F2024G4 Fld: 17G, 1E, 85A GRAI7923
10 Jun 79 105p
Rept No: 79/66S-166
Monitor: 18

Abstract: This report presents the results of the 10 - 19 April 1979 TRACALS evaluation of the Wright-Patterson AN/GRN-29(V) SSILS for runway 05. The evaluation was conducted to determine the capabilities and limitations of the system in its installed environment. Results presented in this report can be used as a guide to anticipated performance until there is a significant change in ground equipment, siting environment, screening, or operational use. (Author)

Descriptors: •Microwave landing systems, •Air Force facilities, Solid state electronics, Airports, Radio transmitters, Microwave antennas, Antenna radiation patterns, Test and evaluation

Identifiers: •AN/GRN-29(V), Wright-Patterson Air Force Base, NTISDODXA

AD-A070 782/8ST NTIS Prices: PC A06/MF A01

Display Processor for Aircraft Landing System

Department of the Navy Washington DC (001840000)

Patent
AUTHOR: Lewis, Bernard L.
G1994E4 Fld: 17G, 1D, 51E, 85A, 90 GRAI8021
Filed 13 Feb 79, patented 8 Apr 80 9p
Rept No: PAT-APPL-6-011 834; PATENT-4 197 543
Supersedes PAT-APPL-011 834-79, AD-D005 828.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

Abstract: A circuit for processing the azimuth error video signal of a monopulse receiver in an aircraft to separately but simultaneously display the heading and position of the craft. The azimuth error signal is simultaneously applied to a sample-and-hold (SAH) circuit, a delay means and a one-shot multivibrator (MV). The MV opens the SAH to accept the first ground-transmitter signal in a sequence, the SAH charging a capacitance to the magnitude of the signal, and then prevents the SAH from accepting any further signals in the sequence. The output of the SAH is subtracted from the delayed signal to obtain a video signal indicative of aircraft position, and the output of the first subtracter is subtracted from the delayed signal to obtain a video signal indicative of the aircraft heading. (Author)

Descriptors: *Patents, *Microwave landing systems, Video signals, Signal processing, Microwave receivers, Cathode ray tube screens, Azimuth, Errors, Multivibrators, Circuits, Monopulse radar, Landing aids, Instrument landings, Position finding

Identifiers: PAT-CL-343-112, Sample and hold circuits, NTISGPN

AD-D007 343/7 NTIS Prices: Not available NTIS

Angle Data Processor for Reciprocating Narrow Scanning Beams

Department of the Air Force Washington D C (109850)

Patent Application
AUTHOR: Litchford, George B.
C2903L1 Fld: 17G, 76C, 90G GRAI7414
Filed 2 Aug 73 8p
Rept No: PAT-APPL-375 557
Monitor: 18
Government-owned invention available for licensing. Copy of application available NTIS.

Abstract: The patent application relates to an angle data processor apparatus for determining the glide angle of an aircraft which is derivable from transmitted narrow reciprocating scanning beams

Descriptors: *Aircraft landings, *Microwave equipment, Patents, Landing aids, Data processing, Glide path systems

Identifiers: PAT-CL-343-108, *Patent applications, NTISGPAF

AD-164 554/8 NTIS Prices: PC E02/MF A01

Study and Analysis of SC-117, National and USAF Plans for a New Landing System

Litchford Systems Northport N Y (388480)

Final rept. May 71-Apr 72
AUTHOR: Litchford, George B.
A5282A1 Fld: 17B, 17G, 51F, 61C GRAI7222
Jul 72 242p
Rept No: L-AF-05
Contract: F33615-71-C-1601
Monitor: AFFDL-TR-72-76-Pt-1

Abstract: With SC-117, national, and USAF plans partially formulated for the design of a new Microwave Landing System (MLS) to meet common civil/military and common CTOL/VSTOL requirements, attention is now focused on technical and operational areas of landing where critical decisions must be made to narrow the competing techniques to a single national standard. The Air Force mission to utilize not only conventional, fixed MLS installations, but also mobile MLS units quickly installed at remote or foreign airfields. A design of a very-low-cost MLS is outlined since the number of military aircraft to be equipped with MLS will be determined by the minimum cost (and minimum service configurations) of the national MLS system. (Author)

Descriptors: (*Glide path systems, Multipath transmission), (*Air traffic control systems, *Microwave equipment), Reviews, Antenna radiation patterns, Aircraft antennas, Flight paths, Phase-locked systems, Cost effectiveness

Identifiers: SC-117 landing system, Microwave landing systems

AD-749 505 NTIS Prices: PC A11/MF A01

Test and Evaluation of Phase III Bendix Basic Narrow and Small Community Time Reference Scanning Beam Microwave Landing System

National Aviation Facilities Experimental Center Atlantic City NJ (240550)

Final rept. Sep 76-Sep 77
AUTHOR: Mackin, Clifford W.
F0711E4 Fld: 17G, 18, 1D, 85A GRAI7910
Nov 78 104p
Rept No: FAA-NA-78-29
Monitor: FAA-RD-78-127

Abstract: Two models of the Time Reference Scanning Beam Microwave Landing System (MLS) the Basic Narrow and Small Community systems designed and built by the Bendix Corporation to FAA specifications, were examined with regard to functional requirements, and compliance with contractual specifications. (Author)

Descriptors: *Instrument landings, *Landing aids, *Microwave landing systems, Government procurement, Contract administration, Specifications, Military operations, Civil aviation, Feasibility studies, Experimental design, Doppler systems, Test facilities, Prototypes, Fabrication

Identifiers: Time reference scanning beams, NTISDODXA, NTISDOTFAA

AD-A062 969/1ST NTIS Prices: PC A06/MF A01

Consideration of Near Field Effects in Microwave Landing System (MLS) Feasibility Evaluation

Mitre Corp Bedford Mass*Electronic Systems Div., L. G. Hanscom Field, Bedford, Mass. (235050)
AUTHOR: Marsh, H. S.
C3523D4 Fld: 17G, 85A GRAI7423
Jul 74 35p
Rept No: MTR-2808
Contract: F19628-73-C-0001
Project: AF-6430
Monitor: ESD-TR-74-184

Abstract: The near field MLS beam pattern may be troublesome if C-band flare guidance is used. One of the complications is introduced by defocusing or broadening of the beam received by an aircraft located in the near field of the antenna. With a C-band flare elevation subsystem, the antenna near field will extend a distance from the antenna sufficient to contain the aircraft during flare and touchdown, and so the precise characteristics of the near field signals must be understood. The effects of beam broadening on system accuracy and signal processing requirements are briefly examined, and experimental investigations are recommended. A short discussion of antenna aperture optimization is also presented, and parallels are drawn between Doppler MLS and synthetic aperture radar. (Author)

Descriptors: *Landing aids, Microwave equipment, Near field, Antenna apertures, Optimization, Beam forming, Feasibility studies

Identifiers: Microwave landing systems, NTISDODAF

AD-784 854/2 NTIS Prices: PC A03/MF A01

EMC Analysis of JTIDS in the 960-1215 MHz Band. Volume 5

Office of Telecommunications, Annapolis, Md.
AUTHOR: Mayher, Robert J.
E1642E4 Fld: 17B, 45A, 45C, 49, 86X GRAI7816
Mar 78 174p
Rept No: OTR-78-140-5
Project: NBS-9018510
Monitor: 18
See also Volume 4, PB-281 120, and Volume 6, PB-281 122.
Also available in set of 8 reports PC E99, PB-281 115-SET.

Abstract: :Contents: Beacon overflight statistical analysis and data.

Descriptors: *Military communication, *Pulse communication, *Electromagnetic compatibility, Ultrahigh frequencies, Radio communication, Radio navigation, Identification systems, Electromagnetic interference, Collision avoidance, Broadband, Tacan, Distance measuring equipment, Air traffic control systems, Radio signals, Analyzing, Data

Identifiers: *Joint tactical information distribution systems, Spread spectrum communication systems, Air traffic control radar beacon systems, Discrete address beacon systems, Beacon collision avoidance systems, Microwave landing systems, Spread spectrum, NTISCOMTEL

PB-281 121/4ST NTIS Prices: PC A08/MF A01

EMC Analysis of JTIDS in the 960-1215 MHz Band. Volume 6

Office of Telecommunications, Annapolis, Md.
AUTHOR: Mayher, Robert J.
E1642F1 Fld: 17B, 45A, 45C, 49, 86X GRAI7816
Mar 78 377p
Rept No: OTR-78-140-6
Project: NBS-9018510
Monitor: 18
See also Volume 5, PB-281 121, and Volume 7, PB-281 123.
Also available in set of 8 reports PC E99, PB-281 115-SET.

Abstract: :Contents: Avionics flight-test data and test plan; Avionics bench test data and test plan; (Portions of this document are not fully legible)

Descriptors: *Military communication, *Pulse communication, *Electromagnetic compatibility, Ultrahigh frequencies, Radio communication, Radio navigation, Identification systems, Electromagnetic interference, Collision avoidance, Broadband, Tacan, Distance measuring equipment, Air traffic control systems, Radio signals, Analyzing, Data

Identifiers: *Joint tactical information distribution systems, Spread spectrum communication systems, Air traffic control radar beacon systems, Discrete address beacon systems, Beacon collision avoidance systems, Microwave landing systems, Spread spectrum, NTISCOMTEL

PB-281 122/2ST NTIS Prices: PC A17/MF A01

EMC Analysis of JTIDS in the 960-1215 MHz Band. Volume 4

Office of Telecommunications, Annapolis, Md.
AUTHOR: Mayher, Robert J.
E1642E3 Fld: 17B, 45A, 45C, 49, 86X GRAI7816
Mar 78 323p
Rept No: OTR-78-140-4
Project: NBS-9018510
Monitor: 18
See also Volume 3, PB-281 119, and Volume 5, PB-281 121.
Also available in set of 8 reports PC E99, PB-281 115-SET.

Abstract: :Contents: JTIDS TACAN/DME beacon bench test statistical analysis and data.

Descriptors: *Military communication, *Pulse communication, *Electromagnetic compatibility, Ultrahigh frequencies, Radio communication, Radio navigation, Identification systems, Electromagnetic interference, Collision avoidance, Broadband, Tacan, Distance measuring equipment, Air traffic control systems, Radio signals, Analyzing, Data

Identifiers: *Joint tactical information distribution systems, Spread spectrum communication systems, Air traffic control radar beacon systems, Discrete address beacon systems, Beacon collision avoidance systems, Microwave landing systems, Spread spectrum, NTISCOMTEL

PB-281 120/6ST NTIS Prices: PC A14/MF A01

EMC Analysis of JTIDS in the 960-1215 MHz Band. Volume 7

Office of Telecommunications, Annapolis, Md.
AUTHOR: Mayher, Robert J.
E1642F2 Fld: 17B, 45A, 45C, 49, 86X GRAI7816
Mar 78 363p
Rept No: OTR-78-140-7
Project: NBS-9018510
Monitor: 18
See also Volume 6, PB-281 122.
Also available in set of 8 reports PC E99, PB-281 115-SET.

Abstract: :Contents: Test plan and data from ATCRBS bench tests and flight tests; JTIDS/MLS/DME test plan; Beacon collision avoidance system (BCAS) flight test data and test plan; Test plan and data from discrete address beacon system (DABS) flight tests; Baseline characteristics of JTIDS; ATC system technical baseline characteristics; Propagation model runs; (Portions of this document are not fully legible)

Descriptors: *Military communication, *Pulse communication, *Electromagnetic compatibility, Ultrahigh frequencies, Radio communication, Radio navigation, Identification systems, Electromagnetic interference, Collision avoidance, Broadband, Tacan, Distance measuring equipment, Air traffic control systems, Radio signals, Analyzing, Data

Identifiers: *Joint tactical information distribution systems, Spread spectrum communication systems, Air traffic control radar beacon systems, Discrete address beacon systems, Beacon collision avoidance systems, Microwave landing systems, Spread spectrum, NTISCOMTEL

PB-281 123/0ST NTIS Prices: PC A16/MF A01

DIALOG File6: NTIS - 64-81/Iss01 (Copr. NTIS) (Item 113 of 257) User 3007 5jan81

EMC Analysis of JTIDS in the 960-1215 MHz Band. Executive Summary

Office of Telecommunications, Annapolis, Md.
AUTHOR: Mayher, Robert J.
E1642D3 Fld: 17B, 45A, 45C, 49, 86X GRAI7816
Mar 78 28p
Rept No: OTR-78-140-S
Project: NBS-9018510
Monitor: 18
See also Volume 1, PB-281 117.
Also available in set of 8 reports PC E99, PB-281 115-SET.

Abstract: The report presents the findings of an investigation to determine the Electromagnetic Compatibility of the Joint Tactical Information Distribution System (JTIDS) Phase I wide-band system with Air Traffic Control (ATC) systems in the 960-1215 MHz band. The 960-1215 MHz band is presently being used by the Tactical Air Navigation (TACAN)/Distance Measuring Equipment (DME), and Air Traffic Control Radar Beacon system (ATCRBS). Firmly planned ATC Systems for this band include the Discrete Address Beacon System (DABS), Beacon Collision Avoidance System (BCAS), and Microwave Landing System (MLS)/DME. An extensive measurement and analysis program was undertaken by a group composed of representatives from FAA, DOD, FCC, OT, ECAC, ARINC Research Corporation and Radio Technical Commission for Aeronautics (RTCA). The measurement program consisted of both bench and flight tests. The test and analysis efforts demonstrated that the Phase I wideband JTIDS signals have either no effect or only minimal operational effects on current designs of existing and firmly planned ATC system equipment. The minimal effects occur only when the ATC systems are receiving desired signals that are at or near their performance limits (near threshold) while simultaneously receiving maximum strength JTIDS signals.

Descriptors: *Military communication, *Pulse communication, *Electromagnetic compatibility, Radio communication, Ultrahigh frequencies, Radio navigation, Identification systems, Electromagnetic interference, Collision avoidance, Broadband, Tacan, Distance measuring equipment, Analyzing, Air traffic control systems, Radio signals

Identifiers: *Joint tactical information distribution systems, Spread spectrum communication systems, Air traffic control radar beacon systems, Discrete address beacon systems, Beacon collision avoidance systems, Microwave landing systems, Spread spectrum, NTISCOMTEL

PB-281 116/4ST NTIS Prices: PC A03/MF A01

EMC Analysis of JTIDS in the 960-1215 MHz Band. Volume 3

Office of Telecommunications, Annapolis, Md.
AUTHOR: Mayher, Robert J.
E1642E2 Fld: 17B, 45A, 45C, 49, 86X GRAI7816
Mar 78 127p
Rept No: OTR-78-140-3
Project: NBS-9018510
Monitor: 18
See also Volume 2, PB-281 118, and Volume 4, PB-281 120.
Also available in set of 8 reports PC E99, PB-281 115-SET.

Abstract: Contents: Analysis of ATCRBS test data; Analysis of MLS/DME susceptibility; Analysis of the susceptibility of firmly planned systems. JTIDS susceptibility to TACAN and ATCRBS interference.

Descriptors: *Military communication, *Pulse communication, *Electromagnetic compatibility, Ultrahigh frequencies, Radio communication, Radio navigation, Identification systems, Electromagnetic interference, Collision avoidance, Broadband, Tacan, Distance measuring equipment, Air traffic control systems, Radio signals, Analyzing, Data

Identifiers: *Joint tactical information distribution systems, Spread spectrum communication systems, Air traffic control radar beacon systems, Discrete address beacon systems, Beacon collision avoidance systems, Microwave landing systems, Spread spectrum, NTISCOMTEL

PB-281 119/8ST NTIS Prices: PC A07/MF A01

EMC Analysis of JTIDS in the 960-1215 MHz Band. Volume 2

Office of Telecommunications, Annapolis, Md.
AUTHOR: Mayher, Robert J.
E1642E1 Fld: 17B, 45A, 45C, 49, 86X GRAI7816
Mar 78 277p
Rept No: OTR-78-140-2
Project: NBS-9018510
Monitor: 18
See also Volume 1, PB-281 117, and Volume 3, PB-281 119.
Also available in set of 8 reports PC E99, PB-281 115-SET.

Abstract: ;Contents: Analysis of beacon bench- and flight-test data; Analysis of avionics bench- and flight-test data.

Descriptors: *Military communication, *Pulse communication, *Electromagnetic compatibility, Ultrahigh frequencies, Radio communication, Radio navigation, Identification systems, Electromagnetic interference, Collision avoidance, Broadband, Tacan, Distance measuring equipment, Air traffic control systems, Radio signals, Analyzing, Data

Identifiers: *Joint tactical information distribution systems, Spread spectrum communication systems, Air traffic control radar beacon systems, Discrete address beacon systems, Beacon collision avoidance systems, Microwave landing systems, Spread spectrum, NTISCOMTEL

PB-281 118/0ST NTIS Prices: PC A13/MF A01

EMC Analysis of JTIDS in the 960-1215 MHz Band. Volume 1

Office of Telecommunications, Annapolis, Md.
AUTHOR: Mayher, Robert J.
E1642D4 Fld: 17B, 45A, 45C, 49, 86X GRAI7816
Mar 78 316p
Rept No: OTR-78-140-1
Project: NBS-9018510
Monitor: 18
See also Executive summary, PB-281 116, and Volume 2, PB-281 118.
Also available in set of 8 reports PC E99, PB-281 115-SET.

Abstract: :Contents: Introduction; Conclusions and recommendations; Analysis approach; JTIDS operational considerations; ATC radionavigation operational considerations; Operational evaluation of JTIDS in the ATC environment.

Descriptors: *Military communication, *Pulse communication, *Electromagnetic compatibility, Ultrahigh frequencies, Radio communication, Radio navigation, Identification systems, Electromagnetic interference, Collision avoidance, Broadband, Tacan, Distance measuring equipment, Air traffic control systems, Analyzing, Radio signals

Identifiers: Joint tactical information distribution systems, Spread spectrum communication systems, Air traffic control radar beacon systems, Discrete address beacon systems, Beacon collision avoidance systems, Microwave landing systems, Spread spectrum, NTISCOMTEL

PB-281 117/2ST NTIS Prices: PC A14/MF A01

Optimization of MLS Receivers for Multipath Environments

Virginia Univ., Charlottesville. School of Engineering and Applied Science

Interim Report
AUTHOR: Mcalpine, G. A.; Highfill, J. H.
C6754F2 Fld: 17G, 85A STAR1411
Mar 76 37p
Rept No: NASA-CR-146664; EE-4033-102-76
Grant: NSG-1128
Monitor: 18

Abstract: The design of a microwave landing system (MLS) aircraft receiver, capable of optimal performance in multipath environments found in air terminal areas, is reported. Special attention was given to the angle tracking problem of the receiver and includes tracking system design considerations, study and application of locally optimum estimation involving multipath adaptive reception and then envelope processing, and microcomputer system design. Results show processing is competitive in this application with i-f signal processing performance-wise and is much more simple and cheaper. A summary of the signal model is given. (Author)

Descriptors: *Equipment specifications, *Microwave landing systems, *Multipath transmission, *Receivers, Aircraft equipment, Cost analysis, Performance, Signal processing, Tracking (Position)

Identifiers: NTISNASA

N76-20102/9ST NTIS Prices: PC A03/MF A01

Optimization of MLS Receivers for Multipath Environments

Virginia Univ., Charlottesville. Dept. of Electrical Engineering.

Annual Report.
AUTHOR: Mcalpine, G. A.; Irwin, S. H.
E0522A4 Fld: 17B, 17G, 18, 45B, 76C, 51B STAR1602
Nov 77 250p
Rept No: NASA-CR-155230; UVA/528062/EE77/104
Grant: NSG-1128
Monitor: 18

Abstract: Optimal design studies of MLS angle-receivers and a theoretical design-study of MLS DME-receivers are reported. The angle-receiver results include an integration of the scan data processor and tracking filter components of the optimal receiver into a unified structure. An extensive simulation study comparing the performance of the optimal and threshold receivers in a wide variety of representative dynamical interference environments was made. The optimal receiver was generally superior. A simulation of the performance of the threshold and delay-and-compare receivers in various signal environments was performed. An analysis of combined errors due to lateral reflections from vertical structures with small differential path delays, specular ground reflections with negligible differential path delays, and thermal noise in the receivers is provided.

Descriptors: *Design analysis, *Microwave landing systems, *Receivers, Systems engineering, Mathematical models, Multipath transmission, Optimization

Identifiers: NTISNASA

N78-11264/6ST NTIS Prices: PC A11/MF A01

Optimization of Mls Receivers for Multipath Environments

Virginia Univ., Charlottesville. School of Engineering and Applied Science.

Interim Report.
AUTHOR: Mcalpine, G. A.; Highfill, J. H. III; Irwin, S. H.; Padgett, J. E.
C6205H3 Fld: 17G, 76C STAR1405
Dec 75 165p
Rept No: NASA-CR-145906; EE-4033-101-75
Grant: NSG-1128
Monitor: 18

Abstract: A receiver is designed for aircraft (A/C), which, as a component of the proposed Microwave Landing System (MLS), is capable of optimal performance in the multipath environments found in air terminal areas. Topics discussed include the angle-tracking problem of the MLS receiver; signal modeling; preliminary approaches to optimal design; suboptimal design; and simulation study. (Author)

Descriptors *Microwave landing systems, *Multipath transmission, *Optimization, *Radio receivers, Automatic landing control, Design analysis, Performance, Signal processing, Terminal facilities

Identifiers: NTISNASA

N76-14056/5ST NTIS Prices PC A08/MF A01

Optimization of MLS Receivers for Multipath Environments

Virginia Univ., Charlottesville. School of Engineering and Applied Science.

Annual Report.
AUTHOR: Mcalpine, G. A.; Highfill, J. H. III; Tzeng, C. P. J.; Koleyni, G.
F0053C2 Fld: 17G, 85A STAR1623
Oct 78 62p
Rept No: NASA-CR-157736; UVA/528062/EE78/106
Grant: NSG-1128
Monitor: 18

Abstract: Reduced order receiver (suboptimal receiver) analysis in multipath environments is presented. The origin and objective of MLS is described briefly. Signal modeling in MLS the optimum receiver is also included and a description of a computer oriented technique which was used in the simulation study of the suboptimal receiver is provided. Results and conclusion obtained from the research for the suboptimal receiver are reported.

Descriptors: *Approach indicators, *Microwave landing systems, Multipath transmission, Optimization, Aircraft equipment, Control theory, Flight simulation, Optimal control, Signal transmission

Identifiers: *Receivers, NTISNASA

N78-32080/1ST NTIS Prices: PC A04/MF A01

Optimization of MLS Receivers for Multipath Environments

Virginia Univ., Charlottesville. Research Labs. for the Engineering Sciences.

Final Report.
AUTHOR: McAlpine, G. A.; Highfill, J. H. III
F1772A1 Fld: 17G, 98, 85A STAR1716
Jun 79 303p
Rept No: NASA-CR-158714; UVA/528062/EE79/107
Grant: NSG-1128
Monitor: 18

Abstract: The angle tracking problems in microwave landing system receivers along with a receiver design capable of optimal performance in the multipath environments found in air terminal areas were studied. Included were various theoretical and evaluative studies such as: (1) signal model development; (2) derivation of optimal receiver structures; and (3) development and use of computer simulations for receiver algorithm evaluation. The development of an experimental receiver for flight testing is presented. An overview of the work and summary of principal results and conclusions are reported.

Descriptors: *Microwave landing systems, *Multipath transmission, *Radio receivers, Algorithms, Computerized simulation, Experimental design, Flight tests, Signal analyzers

Identifiers: NTISNASA, NTISNSFG

N79-24973/6ST NTIS Prices: PC A14/MF A01

Slotted Waveguide Shaped Beam Antenna at Ku Band

Rome Air Development Center Griffiss AFB N Y (309050)

Rept. for 1 Nov 75-31 Aug 77
AUTHOR: McGahan, Robert V.
E0015F3 Fld: 9E, 17G, 49A, 85A GRAI7801
Jun 77 18p
Rept No: RADC-TR-77-205
Project: 4600
Task: 16
Monitor: 18

Abstract: A Ku band slotted waveguide antenna having a cosecant squared radiation pattern is described. The antenna was designed and constructed by means of a method utilizing displaced, inclined, shunt slots in the broad face of WR 62 waveguide. A gain of 12 dB at 15.84 GHz was measured, with crosspolarization rejection of 20 dB. Design equations and curves are included. (Author)

Descriptors *Slot antennas, *Antenna radiation patterns, *Microwave landing systems, *Antenna arrays, Phase measurement, Ku band, Cross polarization, Waveguide slots, Linear polarization, Display systems, Phase locked systems, Horn antennas, Gunn diodes, Oscillators

Identifiers: Cosecant squared patterns, *Microwave antennas, NTISDODXA

AD-A045 586/5ST NTIS Prices: PC A02/MF A01

Far Field Monitor for Instrument Landing Systems

Westinghouse Electric Corp Baltimore MD*Federal Aviation Administration, Washington, DC. Systems Research and Development Service (375500)

Interim rept. on Phases 1 and 2
AUTHOR: More, R.; Bradley, J. C.; Newman, B.
G0714E3 Fld: 17G, 85A GRAI8010
Nov 79 317p
Contract: DOT-FA75WA-3689
Monitor: FAA-RD-79-70

Abstract: This report describes a study performed to determine the nature of scattering of ILS radiated signals by objects on the airport property. These included both taxiing and overflying aircraft. The interaction of this scattered energy with the direct radiation was studied to determine the derogating effects of ILS guidance. This resulted in the development of four system level concepts for detecting glide path derogation. One technique, the Vector DDM, was selected as being most practical from a sensitivity, reliability, and cost point-of-view. (Author)

Descriptors: *Microwave landing systems, *Monitors, Glide slope, Operational effectiveness, Degradation, Microwaves, Scattering, Monitoring, Far field

Identifiers: Localizers, Derogation, Instrument landing systems, NTISDODXA, NTISDOTFAA

AD-A079 663/1 NTIS Prices: PC A14/MF A01

Comparative Study of Flare Control Laws

Old Dominion Univ., Norfolk, VA.

Progress Report, 15 Dec. 1977 - 14 Dec. 1978.
AUTHOR: Nadkarni, A. A.; Breedlove, W. J. Jr
F0983A4 Fld: 17G, 1D, 1B, 51B, 85A STAR1708
Feb 79 73p
Rept No: NASA-CR-158114
Grant: NSG-1480
Monitor: 18

Abstract: A digital 3-D automatic control law was developed to achieve an optimal transition of a B-737 aircraft between various initial glid slope conditions and the desired final touchdown condition. A discrete, time-invariant, optimal, closed-loop control law presented for a linear regulator problem, was extended to include a system being acted upon by a constant disturbance. Two forms of control laws were derived to solve this problem. One method utilized the feedback of integral states defined appropriately and augmented with the original system equations. The second method formulated the problem as a control variable constraint, and the control variables were augmented with the original system. The control variable constraint control law yielded a better performance compared to feedback control law for the integral states chosen.

Descriptors: *Approach control, *Automatic landing control, *Glide paths, Air traffic control, Boeing 737 aircraft, Terminal configured vehicle program, Aircraft landing, Digital navigation, Mathematical models, Microwave landing systems, Noise reduction, Wind profiles

Identifiers: NTISNASA

N79-16822/5ST NTIS Prices: PC A04/MF A01

Interference Analysis between TRSB Microwave Landing System and Adjacent C-Band Radars

IIT Research Inst Annapolis Md (175300)

Final rept
AUTHOR: Nanda, Ved
E0781G3 Fld 1E, 9C, 17G, 17I, 49, 85A, 63H GRA17809
Feb 76 65p
Contract: F19628-76-C-0017, DOT-FA70WAI-175
Project 649E
Monitor: ECAC-PR-76-004

Abstract: The Electromagnetic Compatibility between the Time Reference Scanning Beam (TRSB) Microwave Landing System (MLS) and adjacent C-band radar systems is investigated. Distance constraints required for compatible operation between these systems are established for the three proposed MLS plans of frequency assignment. An addendum to this report contains the data pertaining to those radars with classified characteristics NOTE: This report considers the TRSB MLS design as it was at the time the study was done. Since that time, a number of design changes have been made. These changes are not addressed in the report. (Author)

Descriptors: *Microwave landing systems, *Radar interference, *Electromagnetic compatibility, C Band, Aircraft landings, Aviation safety, Meteorological radar, Search radar, Height finding, Emission spectra, AN/TPS-40, AN/SPS-10, AN/AVQ-10, Sensitivity, Range(Distance)

Identifiers: AN/FPS-77, NTISDODXA, NTISDOTFAA

AD-A049 882/4ST NTIS Prices: PC A04/MF A01

Development Program Advanced Integrated Landing System (AILS)

Airborne Instruments Lab Deer Park N Y (014700)

Final rept.
AUTHOR: O'Connor, John L.
A3014H1 Fld: 17G, 18, 51F GRAI7122
Feb 68 175p
Contract: FA-WA-4616
Project: AIL-2209, FAA-320-204-01N

Abstract: The report describes the design, development, and field and flight tests of an all-weather landing system developed for the FAA. This system, which uses scanning microwave antennas, provides precision azimuth, elevation, and range guidance information to equipped aircraft, and also provides aircraft space position information to a ground monitor radar console. This report provides basic design information on the system and the various units that make up the system. A description of the delivered equipment is also presented. Various tests that were conducted with the equipment, in order to indicate conformity with the contract specification, are also described. The report concludes that the objectives of the development and test program to provide highly accurate space position data for guidance and control of approaching and landing aircraft to touchdown were met. It recommends that more extensive accuracy tests be conducted, that operational tests be started, that further system analysis be performed, and that specifications be prepared and procurements be initiated for 'next generation' equipments. (Author)

Descriptors: (*Landing aids, Reliability(Electronics)), (*All-weather aviation, Commercial planes), Civil aviation, Glide path systems, Distance-measuring equipment, Microwave equipment, Decoding, Navigation computers, Systems engineering, Flight testing

Identifiers: AILS(Advanced Integrated Landing System), Advanced integrated landing system

AD-730 523 NTIS Prices: PC A08/MF A01

Development Program Advanced Integrated Landing System (Ails)

Airborne Instruments Lab., Deer Park, N.Y.
AUTHOR: Oconnor, J. L.
A3535L1 Fld: 17G, 51F STAR0922
Sep 71 180p
Contract: DOT-FAWA-4616

Descriptors: *Aircraft guidance, *Flight tests, *Instrument landing systems, *Radar equipment, *Systems engineering, Microwave antennas, Position (location), Scanners

N71-35777 NTIS Prices: PC A09/MF A01

Solid State Impatt Amplifier Performance Data

Transportation Systems Center Cambridge Mass (407082)

Interim rept Nov 72-Sep 73
AUTHOR: Pantano, Philip J.
C2272E3 Fld: 9E, 49B, 49H GRAI7406
Dec 73 33p
Rept No TSC-FAA-73-19
Monitor FAA-RD-73-177
Prepared in cooperation with Stanford Research Inst., Menlo Park, Calif. Contract DOT-TSC-158

Abstract: Evaluation data on an 8-watt and a 16-watt Impatt Amplifier are presented to concisely describe the performance of these amplifiers. The data include component specifications and photographs, test set-up configuration, amplitude and phase characteristics of the input and/or output, and noise data. The amplifier development effort was pursued in the component development phase of the Microwave Landing System (MLS) Program, because solid state sources are considered a part of the critical technology ultimately required for the MLS systems. The units performed satisfactorily and show promise for the implementation of this solid state source technology into future microwave landing systems. (Author)

Descriptors: *Microwave amplifiers, *Solid state electronics, Avalanche diodes, C band, Performance (Engineering), Landing aids, Microwave equipment

Identifiers: IMPATT diodes, Microwave landing systems, FAA

AD-772 770/4 NTIS Prices: PC A03/MF A01

Control-Display Testing Requirements Study. Volume I

Boeing Commercial Airplane Co Seattle Wash (390145)

Final rept. 24 Jan-24 Aug 72
AUTHOR: Parks, D. L.; Fadden, D. M.; Fries, J. R.
C0753A1 Fld: 17G, 51F GRAI7311
Jan 73 185p
Rept No: D6-60162
Contract: F33615-72-C-1663
Project: AF-404L
Monitor: AFFDL-TR-121-Vol-1
See also Volume 2, AD-758 792.

Abstract: Control-display test development requirements are defined for the microwave landing system portion of the Air Force Advanced Landing System Program. Included are individual test plans, a test integration plan, and program schedules. The approach to deriving test requirements is outlined, including results of surveys and analyses covering the microwave landing system, Air Force users, and landing display systems, and the system analyses to define basic data requirements and to collate system user data based on functional flows and action-information requirements. Details of plan development and supporting data are presented as reference material for use in subsequent test design and test program conduct and for trade data to support on-line decisions. (Author)

Descriptors: (*Microwave equipment, Test methods), (*Terminal flight facilities, *Glide path systems), Radar landing control, Distance-measuring equipment, Display systems, Pulse communication systems, Navigation computers, Ground support equipment, Doppler systems

Identifiers: Microwave landing systems, AF

AD-758 791 NTIS Prices: PC A09/MF A01

Control-Display Testing Requirements Study. Volume II

Boeing Commercial Airplane Co Seattle Wash (390145)

Final rept., 24 Jan-24 Aug 72
AUTHOR: Parks, D. L.; Fadden, D. M.; Fries, J. R.
C0753A2 Fld: 17G, 51F GRAI7311
Jan 73 133p*
Rept No: D6-60162-1
Contract: F33615-72-C-1663
Project: AF-404L
Monitor: AFFDL-TR-121-Vol-2
See also Volume 1, AD-758 791.

Abstract: As an appendix to volume 1 of the Control-Display Testing Requirements Study, the report contains two appendixes relevant to control display-pilot factor testing for the Air Force in the Microwave Landing System (MLS) Program. Appendix 1--Facilities. Facility resource summaries covering resources available or negotiable for Air Force use in the MLS test program, and Appendix 2--Derivation of Action-Information Requirements. These requirements are based on a systems analysis covering approach functions, required actions, and resulting information requirements. (Author)

Descriptors: (*Microwave equipment, Test methods), (*Terminal flight facilities, *Glide path systems), Radar landing control, Distance-measuring equipment, Display systems, Pulse communication systems, Test facilities, Doppler systems, Ground support equipment

Identifiers: Microwave landing systems, AF

AD-758 792 NTIS Prices: PC A07/MF A01

GROUND-BEACON ANTENNAS FOR MONITOR DISPLAY SYSTEM

Bendix Corp Southfield Mich (000000)

Final rept.
AUTHOR: Peace, G. M.; Jaeckle, W. G.; Horton, M. C.
1754J4 USGRDR6508
Oct 64 2p
Contract: FA WA4559
Project: 114 14D
Monitor: SRDS-RD-64-102

Abstract: The results of a development program directed toward the design of improved ground-beacon antennas for use with an airborne monitor display system are presented. Design goals for the ground-beacon antennas are postulated to provide sufficient energy coverage in the runway approach corridor while minimizing energy in directions easily intercepted by reflecting obstacles. Synthesis technique studies were conducted to permit the calculation of an antenna aperture distribution required to radiate a shaped beam pattern. A synthesized aperture distribution was realized by employing complex slots in the broad face of rectangular waveguides. Experimental measurements verified the antenna design techniques. The improved ground-beacon antenna was realized by utilizing the complex-slotted waveguide array as a feed for a parabolic cylindrical reflector and as the basic element of a planar array. Flight test results established the improvement of these shapedbeam antennas over the previous antennas used as ground beacons. (Author)

Descriptors: (*ANTENNAS, LANDING AIDS), (*RUNWAYS, BEACONS), (*BEACONS, ANTENNAS), (*INSTRUMENT LANDINGS, DISPLAY SYSTEMS), (*DISPLAY SYSTEMS, MONITORS), GROUND-CONTROLLED APPROACH RADAR, WAVEGUIDE SLOTS, MICROWAVE EQUIPMENT, ELECTROMAGNETIC WAVES, ANTENNA CONFIGURATIONS, ANALOG COMPUTERS, DIGITAL COMPUTERS, INTEGRAL TRANSFORMS, FOURIER ANALYSIS, BEAMS (ELECTROMAGNETIC), PARABOLIC ANTENNAS, AIRBORNE, DESIGN

Identifiers: MICROVISION, FOURIER INTEGRAL ANALOG COMPUTER

AD-611 811 CFSTI Price: PC A02

Digital Recording and Processing of Doppler Microwave Landing System Data

Royal Aircraft Establishment Farnborough (England)*Defence Research Information Centre, Orpington (England). (310450)

Technical memo.
AUTHOR: Peake, G. E. J.
C5503L1 Fld: 17G, 85A GRA17526
Sep 74 31p
Rept No: RAE-TM-RAD-1063

Monitor: DRIC BR 44286

Abstract: The feasibility demonstration stage in the development of the Doppler Microwave Landing System to meet the ICAO OR involves the collecting and processing during the 9 month trials period of a large amount of data. A description is given of the effect of the various decisions made to ensure satisfactory collection, treatment and presentation of the trials results together with the necessary systems descriptions. Most of the DMLS information is in digital form as is the position reference information derived from kinetheodolites. One hundred hours flying consisting of some 500 runs is planned.

Descriptors: *Microwave landing systems, Doppler systems, Digital systems, Digital recording systems, Data processing, Great Britain, Data acquisition

Identifiers: NTISDODSD

AD-A016 385/7ST NTIS Prices: PC A03/MF A01

Drone Control and Data Retrieval System (DCDRS). Preliminary Design Study Final Report. Volume III. Trade Studies and Analyses. Part X. Launch and Recovery Control Trade Study/Analysis Report

Hughes Aircraft CO Fullerton Calif (172 350)

Technical rept. 6 Mar - 6 Oct 73
AUTHOR: Pico, Louis
C7372C2 Fld: 1C, 17B, 51C GRA17622
Apr 74 225p
Rept No: FR-74-16-271/49098
Contract: F33657-73-C-0664
Monitor: ASD-TR-74-4-Vol-3-Pt-10
See also Volume 3, Part 11, AD-530 024L.
Distribution limitation now removed.

Abstract: Direct and remote control and display of tactical RPV having onboard automatic control and remote data link control/monitor capability, utilizing ground based landing aids, suitable displays for manual override monitor and control, during the all-weather operations have been analyzed to define an optimum launch and recovery control system. Launch and recovery concepts necessary to support the probable mechanisms envisioned for present, near-term, and future RPVs have been collected, evaluated and final recommendations made.

Descriptors: (*Remotely piloted vehicles, Trade off analyses), (*Launching, Remotely piloted vehicles), (*Recovery, Remotely piloted vehicles), Ground support equipment, Remote control, Display systems, Monitoring, Override control, Automatic pilots, Launchers, Launching sites, Compatibility, Integrated systems, Avionics, Control panels, Modular construction, Minicomputers, Checkout procedures, Takeoff, Digital systems, Remote terminals, Head up displays, All weather, Aircraft landings, Landing aids, Microwave equipment, Beacons, Mission profiles, Surveillance drones, Air strikes, Computer graphics, Mission profiles, Flow charting

Identifiers: DCDRS(Drone control and data retrieval system), Drone control and data retrieval system, Design, Drone control facilities, Rocket assisted takeoff, Glide chutes, Rogallo wings, Life cycle costing, NTISDODXD

AD-919 805/2ST NTIS Prices: PC A10/MF A01

Automated Landing, Rollout, and Turnoff Using MLS and Magnetic Cable Sensors

Analytical Mechanics Associates, Inc., Jericho, N.Y.

Final Report.
AUTHOR: Pines, S.; Schmidt, S. F.; Mann, F.
E0425G4 Fld: 17G, 1B, 76C, 51B STAR1601
Oct 77 152p
Rept No: NASA-CR-2907; AMA-77-3
Contract: NAS1-14311
Monitor: 18

Abstract: A description of the simulation program used to study the landing approach, rollout and turnoff of the B737-100 aircraft utilizing MLS and a buried magnetic leader cable as navigation aids is presented. Simulation results are given and show the concept to be both feasible and practical for commercial type aircraft terminal area control.

Descriptors: *Aircraft maneuvers, *Flight control, Computerized simulation, Dynamic models, Approach, Computer programs, Microwave landing systems, Navigation aids, Roll

Identifiers: NTISNASA

N78-10042/7ST NTIS Prices: PC A08/MF A01

Simulation, Guidance and Navigation of the B-737 for Rollout and Turnoff Using Mls Measurements

Analytical Mechanics Associates, Inc., Jericho, N.Y.
AUTHOR: Pines, S.; Schmidt, S. F.; Mann, F.
C6903K2 Fld: 17G, 76D, 85A ST R1413
8 Dec 75 68p
Rept No: NASA-CR-144959; AMA-75-40
Contract: NAS1-13746
Monitor: 18

Abstract: A simulation program is described for the B-737 aircraft in landing approach, a touchdown, rollout and turnoff for normal and CAT III weather conditions. Preliminary results indicate that microwave landing systems can be used in place of instrument landing systems landing aids and that a single magnetic cable can be used for automated rollout and turnoff. Recommendations are made for further refinement of the model and additional testing to finalize a set of guidance laws for rollout and turnoff. (Author)

Descriptors: *Boeing 737 aircraft, *Flight simulation, *Microwave landing systems, Aircraft landing, Automatic landing control, Guidance (Motion), Navigation aids

Identifiers: NTISNASA

N76-22179/5ST NTIS Prices: PC A04/MF A01

Propeller Modulation Effects on a Scanning Beam Microwave Landing System

National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
AUTHOR: Pope, J. M.; Staehle, W. H.
C372184 Fld: 17G, 76C STAR1221
Jul 74 42p
Rept No: NASA-TM-X-62368
Monitor: 18
Subm-Prepared in Cooperation with Raytheon CO., Wayland, Mass

Abstract: An investigation to assess the modulation effects on microwave signals transmitted through rotating propeller blades. Interruption of the antenna line-of-sight signal by the rotating propeller causes a variation of path loss, which produces essentially an amplitude modulation of the received signal. This interruption or blockage effect is generally only partial because of edge diffraction around the particular interfering propeller blade. Signals reflected from the rotating propeller will also cause Doppler frequency shifts to be present in the received signals. A scanning beam microwave landing system (MLS) known as MODILS (modular instrument landing system) was used to process the received signals for display. The effects of propeller modulation were studied by varying the following parameters: (1) spacing between propeller and receiving antenna, (2) propeller dimensions, (3) propeller speed (rpm), (4) number of propeller blades, (5) system data rate, (6) receiver response time, and (7) receiver antenna aperture. (Author)

Descriptors: *Amplitude modulation, *Instrument landing systems, *Microwave scattering, *Microwave transmission, *Propellers, Aircraft landing, Doppler effect, Frequency shift, Glide paths

Identifiers: NTISNASA

N74-31617/5ST NTIS Prices: PC A03/MF A01

The Effects of Stability Augmentation on the Gust Response of a STOL Aircraft during a Curved Manual Approach

Air Force Flight Dynamics Lab Wright-Patterson AFB Ohio (012070)

Final rept. Jun 71-May 75
AUTHOR: Porter, Milton B.
C5221C1 Fld: 20D, 1B, 1C, 51B GRAI7522
Jun 75 228p
Rept No: AFFDL-TR-75-63
Project: AF-8219, AF-1986
Task: 198602
Monitor: 18

Doctoral thesis.

Abstract: The multiple precision approach paths which are possible with microwave landing systems pose new lateral separation problems for the simultaneous optimum curved approach trajectories. Separation criteria for these new multiple paths will be influenced by aircraft path tracking performance. Manually piloted STOL aircraft will be particularly sensitive to atmospheric turbulence during precision tracking. In this study a parametric variation of the open loop poles of a STOL aircraft was made using stability augmentation system (SAS) gains, and the gust response of the manually piloted aircraft was analyzed at points on an MLS approach path. The study was reduced to two quadratic optimal control problems for linear infinite time stochastic systems: (1) to compute the SAS gains using a rate-model-in-the-performance-index pole placement algorithm, and (2) to calculate the pilot gains and system gust response using a quadratic optimal pilot model. Both the SAS and pilot gains calculation yielded reasonable low gains for all cases, and the four lateral-directional poles and the longitudinal short period poles could be placed accurately. The most significant improvement in lateral error was achieved by increasing roll stability. The variation in lateral path error with bank angle was also significant and the nature of the variation was strongly influenced by the specific augmented poles. There was a conflict between good conventional flying qualities and optimum gust response since increased dutch roll frequency yielded the greatest reduction in the objectionable lateral and directional mode cross coupling while increasing the lateral gust response error.

Descriptors: *Aerodynamic stability, *Short takeoff aircraft, Aircraft landings, Approach, Gusts, Gust loads, Turbulence, Augmentation, Air traffic control systems, Microwave landing systems, Pilots, Tracking, Precision, Hand held, Flight paths, Algorithms, Stochastic processes, Vertical orientation, Errors, Computations, Roll, Banking, Theses

Identifiers: Stability augmentation system, SAS(Stability augmentation system), NTISDODXA, NTISDODAF

AD-A014 301/6ST NTIS Prices: PC A11/MF A01

Precision L-Band DME Tests

Federal Aviation Administration Technical Center Atlantic City NJ*Federal Aviation Administration, Washington, DC. Systems Research and Development Service (411863)

Interim rept. May-Nov 78
AUTHOR: Postel, Harold
G2805I1 Fld: 17G, 85A GRAI8101
Aug 80 43p
Rept No: FAA-CT-80-25
Monitor: FAA-RD-80-74

Abstract: This phase of the project was performed under Technical Program Document (TPD) 04-109, subprogram 075-725-210. The report covers the findings on system accuracy and stability of the L-Band Precision Distance Measuring Equipment (PDME). The results showed differences in bias under varying conditions of approaches, orbits, radials, and river runs. The 24-hour overall stability of the system was recorded. Further testing should be performed with simulators that have the desired accuracy required for testing a PDME system so that a baseline can be established. (Author)

Descriptors: *Distance measuring equipment, *Microwave landing systems, Flight testing, Precision, Test and evaluation, Antenna configurations, Experimental data, Performance(Engineering), Interrogators, L band

Identifiers: NTISDODXA, NTISDOTFAA

AD-A089 053/3 NTIS Prices: PC A03/MF A01

Definition of a Data Collection System for U.S. Army Tactical Microwave Landing System Evaluation

Stanford Research Inst Menlo Park Calif (332500)

Supplemental final rept. Mar-Sep 76
AUTHOR: Priedigkeit, J. H.; Stoltz, P. G.
D3005H1 Fld: 1B, 1E, 17G, 51B, 76C GRAI7719
Sep 76 65p
Rept No: SRI-4462-Suppl
Contract: DAAB07-75-C-0906
Monitor: ECOM-75-0906-SF
Supplement to report dated Oct 75, AD-B010 929.

Abstract: The data to be collected for flight test performance evaluation of Tactical Microwave Landing System (TMLS) by the Army is defined. Data rates, data formats, and data processing requirements are developed. Data recording options are considered and a preliminary design for a TMLS airborne data collection system is presented.

Descriptors: *Microwave landing systems, *Army aviation, Flight testing, Data acquisition, Data processing, Airborne, Aircraft landings, Landing aids, Multipath transmission, Landing fields, Tactical air support, Tactical warfare

Identifiers: NTISDODXA

AD-A041 230/4ST NTIS Prices: PC A04/MF A01

Upgraded Third Generation (UG 3rd) Air Traffic Control System. Impressions and Impact on General Aviation

Quinby (Gilbert F) Fort Washington Pa (409712)

Final rept.
AUTHOR: Quinby, Gilbert F.
C6713G3 Fld: 1B, 1E, 17G, 76, 85A GRAI7615
Apr 76 48p
Grant: W1-76-1453-1
Monitor: FAA-RD-76-81

Abstract: Interviews were conducted with seven General Aviation Organizations on the subject of the Upgraded Third Generation System of Air Traffic Control. Spokesmen for General Aviation had a good understanding of the functions and the characteristics of the Upgraded Third Generation ATC System, particularly in those areas of serious interest to General Aviation System Users. With a few exceptions, such as the need for improved weather detection and reporting and other flight services, it appeared that the provisions of the existing generation of Air Traffic Control is reasonably adequate to the present requirements of General Aviation Users. All spokesmen, however, anticipate substantial growth in the demands imposed on the system over the next decade and agree that some improvements in capacity and safety are needed. The report includes a series of matrices showing the degree of importance attached by each segment of General Aviation interviewed to each of the major elements of the Upgraded Third Generation Air Traffic Control Sytem. (Author)

Descriptors: *Civil aviation, *Air traffic control systems, Discrete address beacon systems, Aviation safety, Collision avoidance, Radio navigation, Microwave landing systems, Automation, Air traffic control terminal areas, Wake, Vortices, Ground support equipment, Attitudes(Psychology), Questionnaires

Identifiers: *General aviation, Upgraded third generation, NTISDODXA, NTISDODFAA, NTISDOTFAA

AD-A025 236/1ST NTIS Prices: PC E02/MF A01

New Design and Operating Techniques and Requirements for Improved Aircraft Terminal Area Operations

National Aeronautics and Space Administration. Langley Research Center, Langley Station, Va.
AUTHOR: Reeder, J. P.; Taylor, R. T.; Walsh, T. M.
C4243A2 Fld: 17G, 76C STAR1304
Dec 74 71p
Rept No: NASA-TM-X-72006
Monitor: 18
Conf-Presented at the Sae Air Transportation Meeting, Dallas, 30 Apr. - 2 May 1974.

Abstract: Current aircraft operating problems that must be alleviated for future high-density terminal areas are safety, dependence on weather, congestion, energy conservation, noise, and atmospheric pollution. The Microwave Landing System (MLS) under development by FAA provides increased capabilities over the current ILS. The development of the airborne system's capability to take maximum advantage of the MLS capabilities in order to solve terminal area problems are discussed. A major limiting factor in longitudinal spacing for capacity increase is the trailing vortex hazard. Promising methods for causing early dissipation of the vortices were explored. Flight procedures for avoiding the hazard were investigated. Terminal configured vehicles and their flight test development are discussed. (Author)

Descriptors: *Microwave landing systems, *Operational problems, *Terminal facilities, Air pollution, Aircraft safety, Energy conservation, Instrument landing systems, Noise reduction

Identifiers: NTISNASA

N75-12911/4ST NTIS Prices: PC A04/MF A01

DIALOG File6: NTIS - 64-81/Iss01 (Copr. NTIS) (Item 154 of 257) User 3007 5jan81

Potential Interference to 6 cm CONUS Radio Astronomy Observatories from MLS C-Band A/G DME

IIT Research Inst Annapolis Md (175300)

Final rept.
AUTHOR: Rocca, R. P. Jr
E242282 Fld: 38, 17G, 17B, 54C GRAI7823
Jun 78 70p
Contract: F19628-78-C-0006, DOT-FA70WAI-175
Monitor: FAA-RD-77-111

Abstract: An analysis was performed to determine the potential for interference to radio astronomy observatories operating in the band 4.99-5.00 GHz from the C-band DME (air-to-ground) associated with the Time Reference Scanning Beam Microwave Landing System, as a function of proposed MLS DME frequency assignment plans. (Author)

Descriptors: *Radio astronomy, *Radio interference, Distance measuring equipment, Microwave landing systems, Astronomical observatories, C band, Aircraft landings, Electromagnetic compatibility, Bandwidth, Terrain, High pass filters, Radio transmitters

Identifiers: NTISDODXA, NTISDOTFAA

AD-A057 368/3ST NTIS Prices: PC A04/MF A01

Microwave Landing Guidance Systems Initial Concept Validation Tests

Battelle Memorial Inst Columbus Ohio Columbus Labs (401817)

Final technical rept.
AUTHOR: Ruck, George T.
A1532H3 Fld: 17G, 51I USGRDR7105
Dec 70 62p
Contract: F33615-70-C-1795
Project: AF-404L
Monitor: AFFDL-TR-70-156

Abstract: The report outlines in a very general sense an Air Force microwave landing guidance system concept-validation program. This is to provide the necessary background for the bulk of the report which is concerned with an identification of the critical areas of the RTCA signal format and system description, and some initial tests designed to validate some of the critical features of the RTCA format. The initial tests addressed are laboratory and field tests that can be conducted with standard laboratory equipment and/or equipment currently under procurement by AFFDL. These tests are concerned with those critical areas of the RTCA format that can be validated without flight testing and without requiring special purpose test hardware other than that which will be available early in 1971. Initial flight tests necessary for validating certain elements of the guidance system have not been specifically discussed since the initial laboratory and field tests must be conducted in order that meaningful flight test plans can be prepared and the flight test data analyzed. Some discussion is also given of the facilities required for the conduct of a validation test program. Since facility procurement often involves long lead times, the required facilities must be identified as early as possible. (Author)

Descriptors: (*Landing aids, Instrument landings), Microwave equipment, Distance-measuring equipment, C band, K band, Scanning, Systems engineering

Identifiers: *Instrument landing systems, *Microwave landing systems, Scanning beam landing systems

AD-717 183 NTIS Prices: PC A04/MF A01

Flight Path Control Equipment for Producing Curved Flight Path Profiles with Microwave Landing Systems

Kanner (Leo) Associates, Redwood City, Calif.
AUTHOR: Schaenzer, G.
C3301K3 Fld: 1B, 51B STAR1215
Jun 74 34p
Rept No: NASA-TT-F-15608; DGLR-73-016
Contract: NASW-2481
Monitor: 1B
Tran-Transl. Into English from the German Report Dglr-73-016.
Conf-Presented at the Dglr-Dgon Symp. On New Approach and Landing Tech., Duesseldorf, 2-4 May 1973.

Abstract: The characteristics of a flight path control instrument for producing curved approach profiles and guidance along these profiles are presented. For safety reasons, steep noise abatement approaches must be flown along curved profiles. The problems of flyability, accuracy, and the requirements to be placed on the IFR beacon system and on the flight control system are derived. Flight tests have shown that the techniques discussed contribute to a reduction in the burden on the pilot. (Author)

Descriptors: *Flight control, *Flight paths, *Landing aids, Aircraft guidance, Curvature, Flight safety, Flight test instruments

Identifiers: NTISNASA

N74-26150/4 NTIS Prices: PC E02/MF A01

Flight Path Control Equipment for Producing Curved Flight Path Profiles in Microwave Landing Systems Flugbahnfuehrungsgeraet Zum Erzeugen Gekruemmter Flugbahnprofile an Mikrowellen-Landesystemen

Bodenseewerk Geraetetechnik G.m.b.H., Ueberlingen (West Germany).
AUTHOR: Schaenzer, G.
C2065E3 Fld: 1B STAR1123
1973 36p
Rept No: DGLR-PAPER-73-016
Monitor: 1B
Conf-Presented at the Dglr-Dgon Symp. On Neue Anflug- und Landeverfahren, Duesseldorf, 2-4 May 1973.
Language in German.

Abstract: The properties of a flight control display device for producing curved approach profiles, and the flight control along these profiles, are discussed in the case of a microwave instrument landing system. The prolems of maneuverability, accuracy, and the stability of aircraft motions are treated, and the requirements of the guide beam system and flight control system are formulated. Flight tests have shown that the methods discussed contribute to reduction of pilot workload.

Descriptors: *Approach, *Display devices, *Flight control, *Instrument landing systems, *Turning flight, Aircraft landing, Flight paths, Glide paths, Microwave frequencies

Identifiers: NASA

N73-32526/8 NTIS Prices: PC A03/MF A01

Navigation Systems for Approach and Landing of VTOL Aircraft

Analytical Mechanics Associates, Inc., Mountain View, CA.*National Aeronautics and Space Administration, Washington, DC. (AU945491)
AUTHOR: Schmidt, S. F.; Mohr, R. L.
G1082L3 Fld: 17G, 76D, 51E STAR1810
Oct 79 63p
Rept No: NASA-CR-152335; AMA-79-15
Contract: NAS2-9430

Abstract: The formulation and implementation of navigation systems used for research investigations in the V/STOLAND avionics system are described. The navigation systems prove position and velocity in a cartesian reference frame aligned with the runway. They use filtering techniques to combine the raw position data from navaids (e.g., TACAN, MLS) with data from onboard inertial sensors. The filtering techniques which use both complementary and Kalman filters, are described. The software for the navigation systems is also described.

Descriptors: *Avionics, *Digital navigation, *Uh-1 helicopter, *Vertical takeoff aircraft, Aircraft landing, Approach control, Kalman filters, Microwave landing systems, Tacan

Identifiers: NTISNASA

N80-19055/6 NTIS Prices: PC A04/MF A01

Mixed Ctol/Qtol Traffic Gemischter Ctol/Qtol-Verkehr

Messerschmitt-Boelkow-Blohm G.m.b.H., Ottobrunn (West Germany).
AUTHOR: Schoenberger, F.
C2065E2 Fld: 1B STAR1123
15 Apr 73 30p
Rept No: MBB-UH-05-73-0; DGLR-PAPER-73-014
Monitor: 18
Conf-Presented at the Dglr-Dgon Symp. On Neue Anflug- und Landeverfahren, Duesseldorf, 2-4 May 1973.
Language in German.

Abstract: The results of the transition period when conventional air traffic (CTOL) will be replaced by quiet takeoff and landing (QTOL) traffic, are reviewed. The introduction of QTOL aircraft from about the year 1978 will entail the simultaneous operation of present CTOL and QTOL aircraft types. The effects of this transition period, to be felt by introduction of microwave instrument landing systems and area navigation, are surveyed.

Descriptors: *Air traffic, *Area navigation, *Instrument landing systems, Forecasting, Microwave frequencies, Noise reduction

Identifiers: NASA

N73-32525/0 NTIS Prices: PC A03/MF A01

A Theory of Scattering by Sinusoidal Metal Surfaces

Army Electronics Command Fort Monmouth N J (037620)

Research and development technical rept.
AUTHOR: Schwering, F.; Whitman, G.
D2721C4 Fld: 20N, 46H GRAI7716
May 77 41p
Rept No: ECOM-4496
Project: 1T161102B31A
Task: 01
Monitor: 18

Abstract: A rigorous theory of plane wave scattering by periodic metal surfaces is presented. The physical optics approximation is used to determine the current distribution on the metal surface to first order, but this approximate distribution is modified by multiplication with a Fourier series, whose fundamental period is that of the surface profile (Floquet's theorem). The coefficients of the Fourier series are determined by invoking the condition that the field radiated by the current distribution into the lower (shielded) half-space cancels the primary plane wave in this space range. The scatter problem is thereby reduced to the familiar task of solving a system of linear equations. For certain basic types of surface profiles, the coefficients of the linear system are obtained in closed form (Bessel functions for the sinusoidal profiles considered here, and exponential functions for piecewise linear profiles). Thus, the method requires no numerical integral evaluation and, consequently, is computationally efficient. Since the boundary condition of zero tangential electric field at the metal surface is not utilized, the field within the grooves of the periodic scatter need not be known--a definite advantage of the new method. In addition to a summary of the theory, numerical results for TE-, TM-, and circular polarization of the incident plane wave are presented. (Author)

Descriptors: *Electromagnetic scattering, *Microwaves, Surfaces, Periodic variations, Sine waves, Metals, Harmonics, Boundary value problems, Microwave landing systems, Roofs, Polarization, Plane waves, Fourier analysis, Bessel functions

Identifiers: NTISDODXA

AD-A040 002/8ST NTIS Prices: PC A03/MF A01

An Avionics Sensitivity Study. Volume 1: Operational Considerations

Champlain Technology, Inc., West Palm Beach, Fla.

Final Report, Aug. 1975 - Sep. 1976.
AUTHOR: Scott, R. W.; Mcconkey, E. D.
D3082F3 Fld: 17G, 18, 51E, 51B, 85A STAR1515
Sep 76 230p
Rept No: NASA-CR-145107
Contract: NAS1-14144
Monitor: 18
Subm-Prepared for Systems Control, Inc., Palo Alto, Calif.

Abstract: Equipment and operational concepts affecting aircraft in the terminal area are reported. Curved approach applications and modified climb and descent procedures for minimum fuel consumption are considered. The curved approach study involves the application of MLS guidance to enable execution of the current visual approach to Washington National Airport under instrument flight conditions. The operational significance and the flight path control requirements involved in the application of curved approach paths to this situation are considered. Alternative flight path control regimes are considered to achieve minimum fuel consumption subject to constraints related to air traffic control requirements, flight crew and passenger reactions, and airframe and powerplant limitations.

Descriptors: *Aircraft equipment, *Avionics, *Fuel consumption, *Microwave landing systems, Air traffic control, Approach control, Energy conservation, Flight paths, Terminal guidance

Identifiers: NTISNASA

N77-24082/8ST NTIS Prices: PC A11/MF A01

Effect of External Disturbances and Data Rate on the Response of an Automatic Landing System Capable of Curved Trajectories

National Aeronautics and Space Administration Langley Research Center, Langley Station, Va.
AUTHOR: Sherman, W. L.
C5555F3 Fld: 17G, 01C, 76C, 51C STAR1322
Sep 75 46p
Rept No: NASA-TN-D-7971; L-10040
Monitor: 18

Abstract: The effects of steady wind, turbulence, data sample rate, and control-actuator natural frequency on the response of a possible automatic landing system were investigated in a nonstatistical study. The results indicate that the system, which interfaces with the microwave landing system, functions well in winds and turbulence as long as the guidance law contains proper compensation for wind. The system response was satisfactory down to five data samples per second, which makes the system compatible with the microwave landing system. No adverse effects were observed when actuator natural frequency was lowered. For limiting cases, those cases where the roll angle goes to zero just as the airplane touches down, the basic method for computing the turn-algorithm gains proved unsatisfactory and unacceptable landings resulted. Revised computation methods gave turn-algorithm gains that resulted in acceptable landings. The gains provided by the new method also improved the touchdown conditions for acceptable landings over those obtained when the gains were determined by the old method. (Author)

Descriptors: *Aircraft landing, *Automatic control, *Landing aids, *Terminal guidance, Algorithms, Microwave landing systems, Turbulence effects

Identifiers: NTISNASA

N75-31048/2ST NTIS Prices: PC A03/MF A01

Preliminary Study of a Possible Automatic Landing System

National Aeronautics and Space Administration. Langley Research Center, Langley Station, Va.
AUTHOR: Sherman, W. L.; Winfrey, S. W.
C3514B2 Fld: 17G, 51B, 76C STAR1218
Jul 74 68p
Rept No: NASA-TN-D-7611; L-9246
Monitor: 18

Abstract: Navigation and control laws for a possible automatic landing system have been investigated. The system makes use of data from an inertial table and either an airborne or ground radar to generate signals that guide the airplane to a landing. All landing maneuvers take place within a zone that extends 6000 m out from the touchdown point, 4000 m on each side of the runway center line, and 540 m high. The results show that the system can adequately control the airplane on steep, curved decelerating approaches to a landing that takes place with small errors from the desired landing point and desired airplane attitude. The system studied would interface well with the scanning beam microwave landing system (MLS). The use of this system with the MLS makes it possible to incorporate an independent landing monitor. (Author)

Descriptors: *Aircraft landing, *Automatic landing control, *Terminal facilities, Flight safety, Inertial platforms, Microwave frequencies, Systems engineering

Identifiers: NTISNASA

N74-29119/6 NTIS Prices: PC A04/MF A01

Airport Survey for MLS Multipath Issues

Massachusetts Inst of Tech Lexington Lincoln Lab*Department of the Air Force, Washington, D.C.*Federal Aviation Administration, Washington, D.C. Systems Research and Development Service. (207650)

Project rept.
AUTHOR: Shnidman, D. A.
C6355L1 Fld: 17G, 85A GRAI7611
15 Dec 75 85p
Rept No: ATC-58
Contract: F19628-76-C-0002, DOT-FA74WAI-461
Monitor: FAA-RD-75-195

Abstract: Eight major U.S. civilian airports were visited and data on the surface material of all sizable buildings visible from the runways were obtained. This information is catalogued herein. It is only with the aid of such information that we can address issues such as the likelihood of a system performance changes due to polarization, pattern control and coverage control. A total of 93 buildings and 123 surfaces are included and the breakdown between the various surfaces is as follows. 74 surfaces were corrugated; 17 surfaces were cinder block; 16 surfaces were brick; 9 surfaces were concrete; and, 5 surfaces were smooth metal. Of the 74 corrugated surfaces 18 were of the 'flat' variety, 34 were one of five sub-categories and the remaining 22 needed 15 sub-categories for classification.

Descriptors: *Microwave landing systems, Multipath transmission, Airports, Buildings, Surfaces, Performance(Engineering), Surveys

Identifiers: NTISDODFAA, NTISDOTFAA, NTISDODAF

AD-A022 937/7ST NTIS Prices: PC A05/MF A01

The Logan MLS Multipath Experiment

Massachusetts Inst of Tech Lexington Lincoln Lab*Federal Aviation Administration, Washington, D.C. Systems Research and Development Service. (207650)

Project rept.
AUTHOR: Shnidman, D. A.
C5572J3 Fld: 1E, 17G, 20N, 85A, 76D GRAI7601
23 Sep 75 90p
Rept No: ATC-55
Contract: F19628-76-C-0002, DOT-FA74WAI-461
Monitor: FAA-RD-75-130

Abstract: The National Plan for a Microwave Landing System (MLS) has specified a carrier frequency for the system in the vicinity of 5.1 GHz. At that frequency, no multipath data taken at a major civilian airport existed. The purpose of this experiment was to obtain such data at Logan International Airport in order to ascertain: (1) which objects are the major causes of measurable multipath reflections and their levels relative to the direct signal (M/D level), (2) whether or not the reflections from these objects can be satisfactorily simulated by the Lincoln computer model and, if so, how complicated must that model be, and (3) if the characteristics of multipath provide a significant discriminant between the Doppler and scanning beam techniques. It was found in the experiment that regions where reflections were noted could be predicted from ray optics and diffraction. No measurable reflections were noted elsewhere. For the purpose of modeling for multipath, building surfaces could be characterized as a flat plate with a reflection coefficient determined by measurement if it were a complicated surface, or by the dielectric properties of the surface material, if a simple surface. The airplane reflection model was also found to agree well with measurements. (Author)

Descriptors: *Microwave landing systems, *Microwave transmission, *Multipath transmission, Computerized simulation, Digital computers, Doppler effect, Target discrimination, Flat plate models, Reflectors, S band, Massachusetts

Identifiers: DOT/4IZ/ID, NTISDODXA, NTISDODFAA, NTISDOTFAA

AD-A017 083/7ST NTIS Prices: PC A05/MF A01

Microwave Landing System Utilization and Conventional Avionics

Aeronautical Systems Div Wright-Patterson AFB Ohio (008800)

Final rept. 15 Aug-1 Nov 74
AUTHOR: Showalter, Thomas W.
D3584D4 Fld: 17G, 1E, 5I, 1B, 85A, 51B, 85D GRAI7724
May 76 66p
Rept No: ASD-TR-76-7
Monitor: 18

Abstract: The study examined the effects of flying different microwave landing system approach profile designs with various types of conventional avionics. All the conventional systems used possessed similar limitations in that they were unable to present course guidance throughout the microwave landing system profiles. The loss of course guidance adversely affected pilot performance and, on occasion, made for unsafe conditions. (Author)

Descriptors: *Microwave landing systems, *Avionics, *Flight simulation, Pilots, Aviation safety, Course indicators, Reliability, Performance(Human), Flight paths

Identifiers: NTISDODXA

AD-A044 297/0ST NTIS Prices: PC A04/MF A01

Microwave Landing System Utilization and Digital Avionics

Aeronautical Systems Div Wright-Patterson AFB Ohio (008800)

Final rept Sep-Nov 75
AUTHOR: Showalter, Thomas W.
D3575E1 Fld: 1D, 17G, 85A, 1E GRAI7724
Jul 76 55
Rept No: ASD-TR-76-18
Monitor: 18

Abstract: The study had two objectives. It was designed to assess how well a pilot could determine if he were flying the intended MLS approach path and to examine how profile design affected tracking performance. The study revealed that the pilot was better able to evaluate his location with respect to the nominal approach path horizontally than vertically. Profiles with short final approach legs (2n.m.) and high intercept angles (60 deg) were most difficult to fly. (Author)

Descriptors: *Microwave landing systems, *Instrument landings, *Glide path systems, Digital systems, Flight simulators, Avionics, Ground stations, Turning flight, Display systems, Aviation safety, Errors, Alignment

Identifiers: Digital flight director system, NTISDODXA

AD-A044 106/3ST NTIS Prices: PC A04/MF A01

Airborne Antenna Coverage Requirements for the TCV B-737 Aircraft

National Aeronautics and Space Administration. Langley Research Center, Langley Station, Va.
AUTHOR: Southall, W. A. Jr; White, W. F.
E0922E4 Fld: 9E, 17G, 49A, 85A STAR1606
Jan 78 36p
Rept No: NASA-TM-78647
Monitor: 18

Abstract: The airborne antenna line of sight look angle requirement for operation with a Microwave Landing System (MLS) was studied. The required azimuth and elevation line of sight look angles from an antenna located on an aircraft to three ground based antenna sites at the Wallops Flight Center (FPS-16 radar, MLS azimuth, and MLS elevation) as the aircraft follows specific approach paths selected as representative of MLS operations at the Denver, Colorado, terminal area are presented. These required azimuth and elevation look angles may be interpreted as basic design requirements for antenna of the TCV B-737 airplane for MLS operations along these selected approach paths.

Descriptors: *Aircraft antennas, *Microwave landing systems, Azimuth, Elevation angle, Approach, Flight paths, Terminal guidance

Identifiers: Boeing 737 aircraft, NTISNASA

N78-15325/1ST NTIS Prices: PC A03/MF A01

An RF Link Analysis of MSBLS During Alt

McDonnell-Douglas Technical Services Co., Inc., Houston, Tex. Astronautics Div.
AUTHOR: Speir, R. E.
D0441L2 Fld: 17G, 76C, 85A, 84E STAR1424
5 Sep 75 35p
Rept No: NASA-CR-151019; REPT-1.3-DN-C0303-009
Contract: NAS9-13970
Monitor: 18

Abstract: An analysis of the microwave scanning beam landing system (MSBLS) ground station to orbiter radio frequency (RF) link was made to determine if the expected signal levels will be compatible with orbiter receiver capabilities. Of primary interest was whether or not loss of data will occur due to interference caused by the orbiter 101 nose boom which provides additional air data during the approach and landing test. The results of the analysis indicate that a small amount of data loss may occur due to the proximity of the MSBLS antennas and the nose boom. Tabulated data of antenna radiation patterns are given. (Author)

Descriptors *Data links, *Microwave landing systems, *Space shuttle orbiters, Radio frequencies, Antenna radiation patterns, Ground stations, Microwave antennas, Nose cones, Signal analysis, Systems analysis, Tables (Data)

Identifiers: NTISNASA

N76-33363/2ST NTIS Prices PC A03/MF A01

Analysis of Army Operational Requirements for the Tactical Microwave Landing System

Stanford Research Inst Menlo Park Calif (332 500)

Final rept. Jun-Oct 75
AUTHOR: Stoltz, P. G.; Priedigkeit, J. H.
D0271F1 Fld: 17G, 76D, 85A GRAI7702
Oct 75 87p
Contract: DAAB07-75-C-0906
Project: SRI-4462
Monitor: ECOM-75-0906-F
Distribution limitation now removed.

Abstract: A definitive set of test requirements are developed for the U.S. Army evaluation of the Microwave Landing System (MLS). The approach taken in to (1) access the Army operational requirements for an aircraft landing system in the 1980-1990 era. (2) compare the 1980-1990 operational requirements to the FAA Engineering requirements for the tactical MLS configuration, (3) recommend specific tests to be made by the Army during the MLS Phase-3 evaluation, and (4) review of five computer models for suitability to calculate MLS guidance accuracy in a multipath propagations environment. (Author)

Descriptors: (*Microwave landing systems, Operational test and Evaluation), Aircraft landings, Landing aids, Propagation, Microwave equipment, Mission profiles, Threats, Security, Modes, Tactical warfare, Landing fields, Heliports, Multipath transmission, Tactical warfare, Environments, Performance(Engineering)

Identifiers: Operational requirements, Air space, NTISDODXD

AD-B010 929/8ST NTIS Prices: PC A05/MF A01

Simulation of an Automatically-Controlled STOL Aircraft in a Microwave Landing System Multipath Environment

National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
AUTHOR: Toda, M.; Brown, S. C.; Burrous, C. N.
01511K4 Fld: 17G, 85A, 76D STAR1502
Jul 76 42p
Rept No: NASA-TM-X-73154; A-6693
Monitor: 18

Abstract: The simulated response is described of a STOL aircraft to Microwave Landing System (MLS) multipath errors during final approach and touchdown. The MLS azimuth, elevation, and DME multipath errors were computed for a relatively severe multipath environment at Crissy Field California, utilizing an MLS multipath simulation at MIT Lincoln Laboratory. A NASA/Ames six-degree-of-freedom simulation of an automatically-controlled deHavilland C-8A STOL aircraft was used to determine the response to these errors. The results show that the aircraft response to all of the Crissy Field MLS multipath errors was small. The small MLS azimuth and elevation multipath errors did not result in any discernible aircraft motion, and the aircraft response to the relatively large (200-ft (61-m) peak) DME multipath was noticeable but small. (Author)

Descriptors: *Microwave landing systems, *Multipath transmission, *Short takeoff aircraft, Aircraft control, Automatic control, Error analysis, Flight simulation

Identifiers: NTISNASA

N77-11063/3ST NTIS Prices: PC A03/MF A01

Models for Estimating Runway Landing Capacity with Microwave Landing System (MLS)

California Univ., Berkeley. Institute of Transportation and Traffic Engineering.
AUTHOR: Tosic, V.; Horonjeff, R.
C5622K2 Fld: 17G, 01B, 76C, 51C STAR1323
Sep 75 204p
Rept No: NASA-CR-137746
Grant: NSG-2046
Monitor: 18

Abstract: A model is developed which is capable of computing the ultimate landing runway capacity, under ILS and MLS conditions, when aircraft population characteristics and air traffic control separation rules are given. This model can be applied in situations when only a horizontal separation between aircraft approaching a runway is allowed, as well as when both vertical and horizontal separations are possible. It is assumed that the system is free of errors, that is that aircraft arrive at specified points along the prescribed flight path precisely when the controllers intend for them to arrive at these points. Although in the real world there is no such thing as an error-free system, the assumption is adequate for a qualitative comparison of MLS with ILS. Results suggest that an increase in runway landing capacity, caused by introducing the MLS multiple approach paths, is to be expected only when an aircraft population consists of aircraft with significantly differing approach speeds and particularly in situations when vertical separation can be applied. Vertical separation can only be applied if one of the types of aircraft in the mix has a very steep descent angle. (Author)

Descriptors: *Air traffic control, *Microwave landing systems, Aircraft approach spacing, Aircraft landing, Instrument approach, Instrument landing systems

Identifiers: NTISNASA

N75-32084/6ST NTIS Prices: PC A10/MF A01

The Effect of Landing System Coverage and Path Geometry on Lateral Position Errors at the Runway Threshold

National Aeronautics and Space Administration. Langley Research Center, Langley Station, Va.
AUTHOR: Vicroy, D. D.
E2483H4 Fld: 17G, 1E, 85A STAR1618
Jun 78 25p
Rept No: NASA-TM-78744
Monitor: 18

Abstract: The results of an analytical study performed to determine the effect of the azimuth coverage of a Microwave Landing System (MLS) on the ability of an airplane, with an initial navigation position estimate error, to navigate to the runway threshold are presented. The test path chosen for this study consists of an initial straight segment leading into a 130 deg turn with a 2286 m radius and ending in a straight-in final approach segment. The test path configuration was varied by changing the MLS azimuth coverage angle and the final approach length. The aircraft was positioned with an inital offset to the left or right of the desired path along the line of intersection with the MLS azimuth coverage. A fast time computer simulation program, using a simplistic point mass model of the airplane, was used for this study. The data from this study indicates that the lateral position errors at the runway are primarily a function of the final approach length. The effect of the azimuth coverage on the lateral position errors was restricted by the turn characteristics of the horizontal steering control laws.

Descriptors: *Flight control, *Landing aids, *Microwave landing systems, *Navigation aids, Azimuth, Computerized simulation, Error analysis, Flight paths, Guidance(Motion)

Identifiers: NTISNASA

N78-27100/4ST NTIS Prices: PC A02/MF A01

Doppler Microwave Landing System Electronic Pitch Stabilization

Naval Electronics Lab Center San Diego Calif (403940)

Technical document
AUTHOR: Wager, R. J.
C3254G3 Fld: 17G, 1B, 76C, 51B GRAI7419
3 Jun 74 37p
Rept No: NELC-TD-323
Project: WF21/211/001, XF21-232
Task: XF21-232-017, N64
Monitor: 18

Abstract: As part of the Navy R and D effort in support of the FAA National Microwave Landing System Development, NELC has studied the electronic pitch stabilization method proposed by ITT Gilfillan and determined the stabilization errors resulting from it. The method is shown to have significant errors. It cannot uniformly correct for the errors caused by ship motion over the entire system coverage volume. Residual error after pitch compensation- a function of aircraft position, elevation antenna offset, and selected pitch compensation angle-causes the aircraft to approach the carrier via an undulating path. Residual errors can be reduced by changing the Gilfillan pitch angle, but they remain significant (Author)

Descriptors: *Carrier landings, *Microwave equipment, Landing aids, Doppler effect, Flight decks, Pitch(Motion), Roll, Computer programs

Identifiers: MLS(Microwave Landing Systems), Microwave landing systems, NTISDODN

AD-782 352/9 NTIS Prices: PC A03/MF A01

Trials of the Doppler Microwave Landing System at Manchester International Airport, October/November 1977

Royal Aircraft Establishment, Farnborough (England).
AUTHOR: Walker, D.
GO171G1 Fld: 17G, 85A STAR1723
1977 130p
Rept No: RAE-TR-78144; BR67351
Monitor: 18
Subm-Sponsored by Min. Of Defence.

Abstract: Tests performed at Manchester to determine the multipath environment are described. High levels of azimuth system multipath were found close to the runway threshold but azimuth systems with as small an aperture as 20 wavelengths (1.2 m) gave the equivalent of ILS Category 3 accuracy. No isolated sources of elevation multipath were found and a 39 wavelength aperture system (2.3 m) gave the equivalent of ILS Category 3 accuracy for 3 deg approaches. The coverage requirement of 20 n mile range and + or - 40 deg azimuth was achieved at heights sufficient to give clear line of sight, but at elevation angles below about 1.5 deg shadowing caused signal loss and large errors. Autolands were demonstrated using the 54 wavelength aperture systems. No specifically technique related effects were seen and the results are regarded as representative of typical C-band MLS performance.

Descriptors: *Microwave landing systems, Aircraft landing, Doppler effect, Performance tests, Air traffic control, Aircraft safety, C band, Great britain, Instrument landing systems, Multipath transmission

Identifiers: NTISNASAE, NTISFNUK

N79-32195/6 NTIS Prices: PC A07/MF A01

Trials of the Doppler Microwave Landing System at Manchester International Airport October/November 1977

Royal Aircraft Establishment Farnborough (England)*Defence Research Information Centre, Orpington (England) (310450)

Technical rept.
AUTHOR: Walker, D.
F1925H4 Fld: 17G, 1E, 85A GRAI7922
Nov 78 131p
Rept No: RAE-TR-78144
Monitor: DRIC-BR-67351

Abstract: This report describes tests performed at Manchester to determine the multipath environment at the airport, and to assess the accuracy and coverage of the Doppler Microwave Landing System in this environment. High levels of azimuth system multipath were found close to runway threshold but azimuth systems with as small an aperture as 20 wavelengths (1.2 m) gave the equivalent of ILS Category III accuracy. No isolated sources of elevation multipath were found and a 39 wavelength aperture system (2.3m) gave the equivalent of ILS Category III accuracy for 3 approaches. The coverage requirement of 20 n mile range and + or - 40 deg. azimuth was achieved at heights sufficient to give clear line of sight, but at elevation angles below about 1.5 deg., shadowing caused signal loss and large errors. Autolands were demonstrated using the 54 wavelength aperture systems. No specifically technique related effects were seen and the results are regarded as representative of typical C-band MLS performance. (Author)

Descriptors: *Microwave landing systems, *Doppler navigation, International airports, Performance(Engineering), Accuracy, C band, Multipath transmission, Flight testing, Great Britain

Identifiers: Manchester International Airport, NTISDODXA, NTISFNUK

AD-A070 291/OST NTIS Prices: PC A07/MF A01

Test and Evaluation of Texas Instruments Small Community Microwave Landing System

National Aviation Facilities Experimental Center Atlantic City NJ*Federal Aviation Administration, Washington, DC. Systems Research and Development Service (240550)

Final rept. Feb 77-Aug 78
AUTHOR: Warren, John
G2801G2 Fld: 17G, 85A GRAI8101
May 80 169p
Rept No: FAA-NA-79-34
Monitor: FAA-RD-80-49

Abstract: The purpose of this program was to test the Texas Instruments (TI) model of time reference scanning beam (TRSB) known as the 'Small Community Airport Microwave Landing System' (SCAMLS) for conformance with the contractual proportional coverage and accuracy specifications. The TI SCAMLS is a prototype system intended to provide approach and landing guidance in a low-cost package to relatively low-density, short-runway feeder and general aviation airports. Flight and static tests determined the azimuth and elevation angular errors of the system. Results indicate that the guidance signals from the TI SCAMLS were within contractual specifications. (Author)

Descriptors: *Microwave landing systems, *Landing fields, *Aircraft landings, Identification systems, Glide slope, C band, Low costs, Elevation, Azimuth, Prototypes, Scanning

Identifiers: TRSB(Time Reference Scanning Beam), Angular errors, Elevation errors, GPIP(Glide Path Intercept Point), Small airports, NTISDODXA, NTISDOTFAA

AD-A088 852/9 NTIS Prices: PC A08/MF A01

Air Traffic Control

Massachusetts Inst of Tech Lexington Lincoln Lab (207650)

Quarterly technical summary 1 Nov 71-31 Jan 72
AUTHOR: Weiss, Herbert G.
A4285G2 Fld: 17G, 51F GRAI7212
15 Feb 72 20p
Contract: F19628-70-C-0230
Project: AF-649L
Monitor: ESD-TR-72-57
See also report dated 15 Nov 71, AD-735 322.

Abstract: The report summarizes the progress on Air Force funded tasks within the Division between 1 November 1971 and 31 January 1972. The four areas under investigation are: radar MTI technology, airborne graphical displays, the influence of propagation effects on CNI system performance and the analysis of various microwave landing guidance systems. (Author)

Descriptors: (*Air traffic control systems, Reviews), Moving target indicators, Display systems, Radar beacons, Multipath transmission

Identifiers: Microwave landing systems

AD-740 877 NTIS Prices: PC A02/MF A01

Air Traffic Control

Massachusetts Inst of Tech Lexington Lincoln Lab (207650)

Quarterly technical summary 1 Feb-30 Apr 72
AUTHOR: Weiss, Herbert G.
A4761C4 Fld: 17G, 17I, 51F GRAI7216
15 May 72 16p
Contract: F19628-70-C-0230
Project: AF-649L
Monitor: ESD-TR-72-86
See also report dated 15 Feb 72, AD-740 877.

Abstract: The report summarizes the progress on the Air Traffic Control tasks. The principal effort was directed toward reaching a status which will permit the presentation of tentative conclusions and reports because several of the tasks must be terminated in FY 72. The radar MTI study effort will continue under FAA sponsorship, and the analysis of microwave landing guidance systems will be maintained for the Air Force. Discussions are under way concerning the scope and level of future Air Force-supported effort on airborne graphical displays and CNI system performance analysis. (Author)

Descriptors: (*Air traffic control systems, *Doppler radar), Moving target indicators, Display systems, Multipath transmission

Identifiers: Microwave landing systems

AD-744 826 NTIS Prices: PC A02/MF A01

Flight Performance of the TCV B-737 Airplane at Jorge Newberry Airport, Buenos Aires, Argentina Using Trsb/Mls Guidance

National Aeronautics and Space Administration. Langley Research Center, Langley Station, VA.
AUTHOR: White, W. F.; Clark, L.
G0905C4 Fld: 17G, 5B, 85A, 51B STAR1809
Jan 80 41p
Rept No: NASA-TM-80223

Abstract: The flight performance of the Terminal Configured Vehicle airplane is summarized. Demonstration automatic approaches and landings utilizing time reference scanning beam microwave landing system (TRSB/MLS) guidance are presented. The TRSB/MLS was shown to provide the terminal area guidance necessary for flying curved automatic approaches with final legs as short as 2 km.

Descriptors: *Flight characteristics, *Microwave scanning beam landing system, *Terminal configured vehicle program, Aircraft landing, Instrument approach, Instrument landing systems, Time

Identifiers: NTISNASA

N80-18021/9 NTIS Prices: PC A03/MF A01

Flight Performance of the TCV B-737 Airplane at Kennedy Airport Using TRSB/MLS Guidance

National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
AUTHOR: White, W. F.; Clark, L. V.
G0055H2 Fld: 17G, 85A, 76D STAR1722
Jul 79 29p
Rept No: NASA-TM-80148
Monitor: 18

Abstract: The terminal configured vehicle (TCV) B 737 was flown in demonstration of the time reference scanning beam/microwave landing system (TRSB/MLS). The flight performance of the TCV airplane during the demonstration automatic approaches and landings while utilizing TRSB/MLS guidance is reported. The TRSB/MLS is shown to provide the terminal area guidance necessary for flying curved automatic approaches with short finals.

Descriptors: *Automatic flight control, *Flight tests, *Landing instruments, *Microwave landing systems, *Terminal configured vehicle program, Flight characteristics, Aircraft landing, Aircraft pilots, Boeing 737 aircraft, Computer techniques, Flight paths, Navigation instruments

Identifiers: NTISNASA

N79-31186/6 NTIS Prices: PC A03/MF A01

Flight Test Demonstration of Selected Curved-Segmented Approach Paths Based on Microwave Landing System Guidance

Air Force Flight Dynamics Lab Wright-Patterson AFB Ohio (012070)

Final rept. Jul-Oct 75
AUTHOR: Wyatt, J.; Eastman, D.
C6783L3 Fld: 17G, 85A GRA17616
Jan 76 140p
Rept No: AFFDL-TR-76-43
Monitor: 18

Abstract: The report contains aircraft and pilot performance parameters, such as aircraft tracking errors, response characteristics, and pilot acceptance for eight representative Microwave Landing System Profiles. The USAF T-39 aircraft was capable of flying fully coupled and automatic curved and segmented approaches using MLS position information. The nature of the testing was designed to demonstrate an inherent MLS capability and trend rather than to provide a great amount of statistical data on the feasibility or acceptability of certain curved or segmented approaches. It is concluded from the flight test data gathered at NAFEC, Atlantic City, N.J. that the selected Microwave Landing System can be used to generate sufficient and accurate airborne data to safely perform curved and segmented approaches to landing.

Descriptors: *Microwave landing systems, Approach, Flight testing, Data acquisition, Flight paths

Identifiers: Time referenced scanning beams, NTISDODAF

AD-A025 501/8ST NTIS Prices: PC A07/MF A01

Mls Airborne Antenna Research

Ohio State Univ., Columbus. ElectroScience Lab.

Semiannual Report, period ending May 1975.
AUTHOR: Yu, C. L.; Burnside, W. D.
C575582 Fld: 09E, 49A STAR1401
May 75 57p
Rept No: NASA-CR-145393; SAR-2902-22
Contract: NGL-36-003-138
Monitor: 18

Abstract: The geometrical theory of diffraction was used to analyze the elevation plane pattern of on-aircraft antennas. The radiation patterns for basic elements (infinitesimal dipole, circumferential and axial slot) mounted on fuselage of various aircrafts with or without radome included were calculated and compared well with experimental results. Error phase plots were also presented. The effects of radiation patterns and error phase plots on the polarization selection for the MLS airborne antenna are discussed. (Author)

Descriptors: *Airborne equipment, *Antenna radiation patterns, *Microwave landing systems, Error analysis, Numerical analysis, Polarization characteristics, Space shuttles

Identifiers: NTISNASA

N76-10378/7ST NTIS Prices: PC A04/MF A01

Research on MLS Airborne Antenna

Ohio State Univ., Columbus. ElectroScience Lab.

Semiannual Report, period ending Nov. 1975.
AUTHOR: Yu, C. L.; Burnside, W. D.
C683583 Fld: 09E, 49A STAR1412
Apr 76 52p
Rept No: NASA-CR-146844; SAR-2902-23
Contract: NGL-36-008-138
Monitor: 18
Misc-Original Contains Color Illustrations.

Abstract: Numerical solutions for the radiation patterns of antennas mounted on aircraft are developed. The airborne antenna problems associated with the Microwave Landing System (MLS) are emphasized. Based on the requirements of the MLS, volumetric pattern solutions are essential. Previous attempts at solving for the volumetric patterns were found to be far too complex and very inefficient. However as a result of previous efforts, it is possible to combine the elevation and roll plane pattern solutions to give the complete volumetric pattern. This combination is described as well as the aircraft simulation models used in the analysis. A numerical technique is presented to aid in the simulation of the aircraft studied. Finally, a description of the input data used in the computer code is given. (Author)

Descriptors: *Aircraft antennas, *Microwave landing systems, Aircraft equipment, Aircraft models, Antenna radiation patterns, Computerized simulation, Numerical analysis

Identifiers: NTISNASA

N76-21181/2ST NTIS Prices: PC A04/MF A01

Volumetric Pattern Analysis of Fuselage-Mounted Airborne Antennas

Ohio State Univ., Columbus. ElectroScience Lab.

Ph.D. Thesis.
AUTHOR: Yu, C. L.
C6911J3 Fld: 09E, 17B, 49A, 45B STAR1413
Apr 76 200p
Rept No: NASA-CR-147099; TR-2902-24
Contract: NGL-36-008-138
Monitor: 18

Abstract: A volumetric pattern analysis of fuselage-mounted airborne antennas at high frequencies was investigated. The primary goal of the investigation was to develop a numerical solution for predicting radiation patterns of airborne antennas in an accurate and efficient manner. An analytical study of airborne antenna pattern problems is presented in which the antenna is mounted on the fuselage near the top or bottom. Since this is a study of general-type commercial aircraft, the aircraft was modeled in its most basic form. The fuselage was assumed to be an infinitely long perfectly conducting elliptic cylinder in its cross-section and a composite elliptic cylinder in its elevation profile. The wing, cockpit, stabilizers (horizontal and vertical) and landing gear are modeled by N sided bent or flat plates which can be arbitrarily attached to the fuselage. The volumetric solution developed utilizes two elliptic cylinders, namely, the roll plane and elevation plane models to approximate the principal surface profile (longitudinal and transverse) at the antenna location. With the belt concept and the aid of appropriate coordinate system transformations the solution can be used to predict the volumetric patterns of airborne antennas in an accurate and efficient manner. Applications of this solution to various airborne antenna problems show good agreement with scale model measurements. Extensive data are presented for a microwave landing antenna system. (Author)

Descriptors: *Antenna radiation patterns, *Commercial aircraft, *Microwave antennas, *Prediction analysis techniques, Cockpits, Elliptical cylinders, High frequencies, Landing gear, Mathematical models, Microwave landing systems, Numerical analysis, Scale models

Identifiers: *Aircraft antennas, NTISNASA

N76-22419/5ST NTIS Prices: PC A09/MF A01

An Overview and Assessment of Plans and Programs for the Development of the Upgraded Third Generation Air Traffic control System

Mitre Corp Mclean Va*Federal Aviation Administration, Washington, D.C. Office of Systems Engineering Management. (402364)
C4625K1 Fld: 17G, 85A* GRAI7513
Mar 75 227p
Rept No: M73-237-Rev-1
Contract: DOT-FA7OWA-2448
Monitor: FAA-EM-75-5

Abstract: The document presents information on the scope, rationale, costs, schedules, and possible benefits of the air traffic control system being developed for operational use in the 1980's and well into the 1990's. The ATC system currently in use, the Third Generation ATC System, is described and the need for improvements are identified. The goals and objectives of the Upgraded Third Generation System (UG3RD) are discussed. Forecasts of future air traffic through 1975 are shown. The fact that the need for development of the major features of the UG3RD is relatively independent of forecasts of traffic growth is shown. The nine major features of the UG3RD are discussed in some length including need, objectives, technical description, benefits, major issues, implementation considerations, benefits, and schedules, major milestones and resource requirements through FY83. The way in which each major feature contributes toward achieving the overall goals and objectives is discussed. Overall development costs are presented along with gross estimates of F and E costs. The needs for longer term improvements are mentioned.

Descriptors: *Air traffic control systems, Assessment, Management planning and control, Beacons, Automation, Landing aids

Identifiers: DOT/4IZ/ID, Discrete address beacon systems, DABS(Discrete Address Beacon Systems), Microwave landing systems, Wake vortex avoidance systems, NTISDODFAA, NTISDOT

AD-A008 940/9ST NTIS Prices: PC A11/MF A01

Applications of Advances in Navigation to Guidance and Control

Advisory Group for Aerospace Research and Development Neuilly-Sur-Seine (France) (400043)

Conference proceedings.
E1421I4 Fld: 17G, 17C, 76D, 76B, 75B GRAI7815
Feb 78 284p
Rept No: AGARD-CP-220
Monitor: 18
Presented at the Technical Meeting of the Guidance and Control Panel Symposium (24th) held on 10-13 May 77, at Stuttgart (West Germany).

Abstract: These Proceedings consist of twenty-two papers contained in the programme of the AGARD Guidance and Control Panel Symposium held in Stuttgart, Germany 10-13 May 1977 The papers are grouped under the following session titles: Keynote Session-I: Improvements in Inertial Navigation Systems and their Applications -II: Improvements in Radar and Radio Navigation Aids and their Applications - III: Specific Functions and System Concepts-IV: New Major Systems -V: Systems Improvements and Concepts. A Technical Evaluation Report on the Symposium is published separately as AGARD Advisory Report No.115. (Author)

Descriptors: *Inertial navigation, *Radio navigation, *Radar navigation, Systems engineering, Direction finding, Range finding, Microwave landing systems, Symposia, All weather aviation, Strapped down systems, Weapon delivery, Airborne, NATO

Identifiers: NATO furnished, AN/ARN-101, *Meetings, NTISDODXA

AD-A052 862/OST NTIS Prices: PC A13/MF A01

Contributions to the Evaluation of the German Proposal DIs for a New Microwave Landing System, Part 1 Beitraege Zur Erprobung des Deutschen Vorschlages DIs fuer Ein Neues Mikrowellen-Landesystem, 1. Teil

Technische Universitaet, Brunswick (West Germany). Sonderforschungsbereich 58 Flugfuehrung.
E0181B3 Fld: 17G, 1B, 76C, 85A STAR1523
Sep 76 91p
Rept No: TUBS/SFB58/M1-PT-1
Monitor: 18
Seri-2.
Partly in German and English.

Abstract: No abstract available.

Descriptors: *Distance measuring equipment, *Instrument landing systems, *Microwave landing systems, Anthropology, Automatic flight control, Multipath transmission, Propagation modes

Identifiers: West Germany, NTISNASAE

N77-32105/7ST NTIS Prices: PC A05/MF A01

Contributions to the Evaluation of the German Proposal DIs for a New Microwave Landing System, Part 2 Beitraege Zur Erprobung des Deutschen Vorschlages DIs fuer Ein Neues Mikrowellenlandesystem, 2. Teil

Technische Universitaet, Brunswick (West Germany). Sonderforschungsbereich 58 Flugfuehrung.
E0181B4 Fld: 17G, 18, 76C, 85A STAR1523
Mar 77 79p
Rept No: TUBS/SFB58/M2-PT-2
Monitor: 18
Ser1-2.
Partly in German and Partly in English.

Abstract: No abstract available.

Descriptors: *Distance measuring equipment, *Microwave landing systems, Austria, Elevation angle, Instrument landing systems, Landing simulation, Mountains, Multipath transmission, Null zones, Propagation modes

Identifiers: West Germany, NTISNASAE

N77-32112/3ST NTIS Prices: PC A05/MF A01

D. C. Systems Research and Development Service. United States Microwave Landing System (MLS) Development Program Symposium

Federal Aviation Administration Washington D C Systems Research and Development Service (340170)
C1374D2 Fld: 17G, 51F GRAI7318
Jun 73 333p
Rept No: FAA-RD-73-95
Project: FAA-075-325
Monitor: 18

Abstract: The purpose of the meeting was to inform the aviation community of the progress and results achieved to date and to provide an open forum for the exchange of information and views on the program. The document, which is a record of the symposium, includes an overview of the background and current status of the program and detailed information on the four MLS system approaches that will be field tested in the Phase II Feasibility Demonstration Program. (Author)

Descriptors: (*Glide path systems, *Symposia), Microwave equipment, Instrument landings, Automatic pilots, Reviews

Identifiers: *Microwave landing systems, FAA

AD-763 917 NTIS Prices: PC E10/MF A01

Discrete Address Beacon System (DABS) Front End Processor/En Route Central Computer Complex Protocol

Federal Aviation Administration Washington DC Systems Research and Development Service (340170)

Final rept.
G1902A1 Fld: 17G, 9B, 17B, 85A, 45C GRAI8020
Apr 80 17p
Rept No: FAA-RD-80-37

Abstract: The FAA has developed the Discrete Address Beacon System (DABS) as an evolutionary replacement for the current Air Traffic Control Radar Beacon System (ATCRBS). The DABS sensor, singly and in cooperation with other DABS sensors, will provide surveillance of, and two-way digital communications with aircraft equipped with DABS transponders, and provide surveillance of ATCRBS-equipped aircraft. Surveillance data and data link services will be provided via suitable land lines to Air Traffic Control (ATC) facilities (terminal and en route). The DABS/ATC interface consists of two digital links to each facility: a two-way communications link and a one-way surveillance link from sensor to ATC. The Common ICAO Data Interchange Network (CIDIN) protocol is used on the two-way communications data link. When DABS is interfaced to an en route ATC facility, a special device, called the front end processor (FEP) is used to perform translation between the CIDIN protocol and the protocol used by the En Route Central Computer Complex (CCC). This document defines the protocol to be used between the FEP and the En Route CCC. (Author)

Descriptors: *Discrete Address Beacon Systems, *Data links, *Control systems, *Computer applications, Message processing, Formats, Communications networks, Transponders, Data reduction, Air traffic control systems, Front end processors

Identifiers: CIDIN(Command ICAO Data Interchange Network), Protocols, NTISDODXA

AD-A085 482/8 NTIS Prices: PC A02/MF A01

Engineering and Development Program Plan - Concepts, Design, and Description for the Upgraded Third Generation Air Traffic Control System

Mitre Corp Mclean Va (402364)
C0311C2 Fld: 17G, 51F GRAI7305
Aug 72 151p
Rept No: MTR-6152-Rev-1
Contract: DOT-FA70WA-2448
Monitor: FAA-ED-01-1A
Supersedes report dated January 1972, AD-743 635.

Abstract: The Air Traffic Control (ATC) system for the next 10 to 20 years is described in two parts: CONUS AIR TRAFFIC CONTROL (includes FSS automation), and OCEANIC AIR TRAFFIC CONTROL (includes AEROSAT applications). The design of both systems is based upon significant improvements in the Third Generation ATC System now being deployed. Key features are: Metering and Spacing Automation, Intermittent Positive Control (IPC), ATC data link services, the Discrete Address Beacon System (DABS), the application of Area Navigation to ATC, the Microwave Landing System (MLS), and the application of satellites to oceanic ATC. The role of automation in both ATC and the delivery of flight services will be greatly expanded to assure system safety, while increasing airport and control system capacities in a productive manner. The above features are integrated into the expected overall system configuration, and its 'fail operational' features are identified. (Author)

Descriptors: (*Air traffic control systems, *Management planning), Design, Automation, Systems engineering, Navigation

Identifiers: Discrete address beacon systems, Microwave landing systems, Area navigation, Oceanic air traffic control

AD-753 988 NTIS Prices: PC A08/MF A01

Integrated National Airspace Communication System (INACS) for the Support of Air Traffic Control Operations in the 1980s and 1990s. Operational/Maintenance Requirements

Federal Aviation Administration Washington D C (403270)
C5724B1 Fld: 17B, 17G, 1B, 85A, 45C GRAI7603
11 Jul 75 142p
Rept No: FAA-INACS-011-221-0R
Monitor: 18

Abstract: This document is intended to provide the operating/maintenance requirements/goals for future National Airspace System communications system designs and developmental efforts, and the vehicle for discussion and coordination with the various policy, planning, operating, maintenance, and engineering activities concerned with FAA Communications. Requirements submitted by Air Traffic and Airway Facilities Services have been used and augmented by inputs from SRDS, MITRE and the Computer Sciences Corporation. Communications requirements are established for all national airspace environments. This document provides the basic sets of requirements applicable to each of the environments and their subsets, i.e., voice/data air/ground communications, voice ground/ground communications and data ground/ground communications. These requirements will be utilized to derive the detailed functional and design requisites to be incorporated in all Integrated National Airspace Communication System (INACS) specifications.

Descriptors: *Communication and radio systems, *Air traffic control systems, Voice communications, Commercial aviation, Data links, Radio links, Microwave landing systems, Integrated systems, Operation, Maintenance, Requirements.

Identifiers: Federal aviation administration, DOT/4HZ/HD, DOT/4IZ/ID, NTISDODXA, NTISDODFAA, NTISDOTFAA

AD-A018 561/1ST NTIS Prices: PC A07/MF A01

International Microwave Landing System (MLS) Symposium Held at Washington, D. C. on November 30 through December 4, 1973

Federal Aviation Administration Washington D C Systems Research and Development Service (340170)
C2982C3 Fld: 17G, 85A* GRAI7415
Apr 74 471p*
Rept No FAA-RD-74-56
Monitor: 18

Abstract: The Federal Aviation Administration/Department of Transportation sponsored a three-day International Microwave Landing System Symposium in Washington, D.C., November 30 and December 3, 4, 1973. The symposium served as an open forum for exchange of technical information between International Civil Aviation Organization (ICAO) member nations sponsoring MLS development programs as well as others having an interest in these efforts. This document, which is a record of the symposium, includes presentations by the five nations with programs underway. In addition, Canada offered a presentation on a Short Take Off and Landing (STOL) demonstration program, and several presentations were offered on MLS operational and technical considerations. (Modified author abstract)

Descriptors: *Landing aids, *Meetings, Microwave equipment, Doppler systems, Distance measuring equipment, Data links, Radar beacons, Air traffic control systems

Identifiers: *Microwave landing systems, NTISFAA

AD-779 312/8 NTIS Prices: PC A20/MF A01

Microwave Landing System (MLS) Development Plan as Proposed by Raytheon During the Technique Analysis and Contract Definition Phase of the National MLS Development Program. Volume I. Executive Summary

Raytheon Co Wayland Mass (298350)
C2272H1 Fld: 17G, 85A GRAI7406
Sep 72 35p
Contract: DOT-FA72WA-2803
Monitor: FAA-RD-73-150-1
See also Volume 2, AD-772 781.

Abstract: Volume I, Executive Summary, presents a short overview of Raytheon's system approach and post technique analysis and contract definition (TACD) plans.

Descriptors: *Landing aids, Microwave equipment, Beams(Radiation), Scanning, Electronic switching, C band, K band, Electronic equipment, Multipath transmission

Identifiers: *Microwave landing systems, MLS(Microwave Landing Systems), FAA

AD-772 780/3 NTIS Prices: PC A03/MF A01

Microwave Landing System (MLS) Development Plan as Proposed by ITT/Gilfillan During the Technique Analysis and Contract Definition Phase of the National MLS Development Program. Volume II. Appendices, A1, A2, D, G, H, I, J, L, M, N, Q and R

ITT Gilfillan Inc Van Nuys Calif*Federal Aviation Administration, Washington, D.C. Systems Research and Development Service. (388599)
C345582 Fld: 17G, 85A GRAI7422
27 Sep 72 355p
Contract: DOT-FA72WA-2805
Monitor: FAA-RD-74-118-Vol-2
See also Volume 1, AD-784 609.

Abstract: ;Contents: Principles of the doppler technique; Signal format specification microwave landing system; Multipath problem analysis; Spectrum of the doppler signal; Processor theory of image rejection; Theory of high scalloping rate problem; Delay line processors; Description of an advanced multimode processor mechanization; Theory of multimode digital processor acquisition; Bench simulation program; Doppler field test results; Intermodulation interference design considerations; Angular filters study results.

Descriptors: *Landing aids, Microwave equipment, C band, Engineering, Systems analysis, Doppler systems, Signals, Signal processing, Digital systems, Processing equipment, Intermodulation, Interference

Identifiers: *Microwave landing systems, NTISDODFAA, NTISDOT

AD-784 343/6 NTIS Prices: PC E07/MF A01

Microwave Landing System (MLS) Development Plan as Proposed by Bendix Corporation During the Technique Analysis and Contract Definition Phase of the National MLS Development Program. Volume VI. Notes MLS-BAC-3 through 9, 11-18 MLS-STI-5, MLS-RHM-1

Bendix Corp Baltimore Md*Federal Aviation Administration, Washington, D.C. Systems Research and Development Service. (389220)
C4424L3 Fld: 17G, 85A GRAI7510
27 Sep 72 648p
Contract: DOT-FA72WA-2801
Monitor: FAA-RD-74-152-6
See also Volume 5, AD/A-006 973.

Abstract: The report details technical aspects of Bendix proposed MLS hardware development. Volume VI contains technical notes MLS-BAC-3 through 9 and 11 through 18, MLS-STI-5, and MLS-RHM-1.

Descriptors: *Landing aids, Microwave equipment, Planning, Distance measuring equipment, Transponders

Identifiers: *Microwave landing systems, DOT/415/ID, NTISDODFAA, NTISDOT

AD/A-006 974/0ST NTIS Prices: PC E09/MF A01

Microwave Landing System (MLS) Development Plan as Proposed by Texas Instruments, Inc. During the Technique Analysis and Contract Definition Phase of the National MLS Development Program. Volume V. Appendixes E1 and E2

Texas Instruments Inc Dallas•Federal Aviation Administration, Washington, D.C. (347650)
C4075D1 Fld: 17G, 76D, 85A GRAI7505
27 Sep 72 263p
Contract: DOT-FA72WA-2802
Project: FAA-075-325-013
Monitor: FAA-RD-74-170-5
See also Volume 4, AD/A-003 377 and Volume 7, AD/A-003 380.

Abstract: ;Contents: Mechanical scan studies; Atmospheric studies.

Descriptors: •Landing aids, Microwaves, Instrument landings, C band, Ku band, Mechanical scanning, Attenuation, Electromagnetic scattering

Identifiers: DOT/4IZ/ID, •Microwave landing systems, Instrument landing systems, NTISDODFAA, NTISDOT

AD/A-003 378/7ST NTIS Prices: PC A12/MF A01

Microwave Landing System (MLS) Development Plan as Proposed by Hazeltine Corporation during the Technique Analysis and Contract Definition Phase of the National MLS Development Program. Volume II. Multipath, Shadowing and Terrain

Hazeltine Corp Greenlawn N Y (406971)
C2853D4 Fld: 17G, 85A GRAI7413
27 Sep 73 608p
Rept No: 10926-Vol-2
Contract: DOT-FA72WA-2804
Project: FAA-075-325-013
Monitor: FAA-RD-73-185-2
See also Volume 1, AD-778 215 and Volume 3, AD-778 140.

Abstract: Volume II covers multipath, shadowing and terrain; propagation and polarization; DME verification, identification and resolution of remaining technical problems, system trades; system compatibility; system performance summary; and signal format summary. (Modified author abstract)

Descriptors: •Landing aids, Microwave equipment, Doppler systems, Multipath transmission, Shadows, Terrain, Polarization, Propagation, Distance measuring equipment, Systems engineering, Trade off analyses

Identifiers: •Microwave landing systems, FAA

AD-778 118/0 NTIS Prices: PC E08/MF A01

Microwave Landing System (MLS) Development Plan as Proposed by AIL During the Technique Analysis and Contract Definition Phase of the National MLS Development Program. Part 3.0 Volume 3.1 Book II. Compilation of Critical Technical Area Reports

Ail Deer Park N Y (404967)
C2263J2 Fld: 17G, 85A GRAI7406
27 Sep 72 351p
Contract: DOT-FA72WA-2800
Project: FAA-075-325-013
Monitor: FAA-RD-73-166-Vol-3 1 2
See also AD-772 596 and AD-772 598.

Abstract: Part 3.0, Volume 3.1, Books I and II present analysis of Critical Technical Areas.

Descriptors: •Landing aids, Microwave equipment, Systems engineering, C band, K band, Scanning, Engineering, Multipath transmission, Electronic equipment

Identifiers: •Microwave landing systems, MLS(Microwave Landing Systems), FAA

AD-772 597/1 NTIS Prices: PC A16/MF A01

Microwave Landing System (MLS) Development Plan as Proposed by Bendix Corporation During the Technique Analysis and Contract Definition Phase of the National MLS Development Program. Volume I. Technique Analysis Program

Bendix Corp Baltimore Md*Federal Aviation Administration, Washington, D.C. Systems Research and Development Service. (389220)
C4424K3 Fld: 17G, 85A GRAI7510
27 Sep 72 394p
Contract: DOT-FA72WA-2801
Monitor: FAA-RD-74-152-1
See also Volume 2, AD/A-006 993.

Abstract: The report details technical aspects of Bendix proposed MLS hardware development. Volume I covers the Technique Analysis Program.

Descriptors: *Landing aids, Microwave equipment, C band, Ku band, Scanning, Beams(Radiation), Antenna arrays, Electronic scanners, Systems analysis, Planning

Identifiers: *Microwave landing systems, DOT/4IZ/ID, NTISDODFAA, NTISDOT

AD/A-006 970/8ST NTIS Prices: PC A17/MF A01

Microwave Landing System (MLS) Development Plan as Proposed by ITT/Gilfillan During the Technique Analysis and Contract Definition Phase of the National MLS Development Program. Volume III. Appendices, W, X, Y, Z, AA, CC, II, JJ and KK

ITT Gilfillan Inc Van Nuys Calif*Federal Aviation Administration, Washington, D.C. Systems Research and Development Service. (388599)
C345583 Fld: 17G, 85A GRAI7422
27 Sep 72 437p
Contract: DOT-FA72WA-2805
Monitor: FAA-RD-74-118-Vol-3
See also Volume 2, AD-784 343.

Abstract: ;Contents: Coverage and siting study; Accuracy requirements; Minimum guidance altitude; Steep angle approach; Accuracy and data requirements; Airborne antenna configuration analysis for the microwave landing system; Computer simulation of doppler MLS; Operational requirements; Operational concepts and general capabilities.

Descriptors: *Landing aids, Microwave equipment, C band, Site selection, Accuracy, Guidance, Approach, Aircraft antennas, Computerized simulation

Identifiers: *Microwave landing systems, NTISDODFAA, NTISDOT

AD-784 344/4 NTIS Prices PC A19/MF A01

Microwave Landing System (MLS) Development Plan as Proposed by Hazeltine Corporation during the Technique Analysis and Contract Definition Phase of the National MLS Development Program. Volume I. System Concept and Integration

Hazeltine Corp Greenlawn N Y (406971)
C2855E1 Fld: 17G, 85A GRAI7413
27 Sep 73 431p
Rept No: 10926-Vol-1
Contract: DOT-FA72WA-2804
Project: FAA-075-325-013
Monitor: FAA-RD-73-185-1
See also Volume 2, AD-778 118.

Abstract: Volume I discusses system concept and integration, geometry effects, guidance signal generation and guidance receiver-decoder. (Modified author abstract)

Descriptors: *Landing aids, Microwave equipment, Doppler systems, Systems engineering, C band, Ku band, Guidance, Transmitters, Receivers, Antenna arrays

Identifiers: *Microwave landing systems, FAA

AD-778 215/4 NTIS Prices: PC A19/MF A01

Microwave Landing System (MLS) Development Plan as Proposed by Raytheon During the Technique Analysis and Contact Definition Phase of the National MLS Development Program. Volume II: System Approach-- Appendix A Functional Requirements Supporting Studies-- Appendix B Detailed Feasibility Hardware Specs-- Appendix C

Raytheon Co Wayland Mass (298350)
C2272H2 Fld: 17G, 85A GRAI7406
Sep 72 383p
Contract: DOT-FA72WA-2803
Monitor: FAA-RD-73-150-2
See also Volume 1, AD-772 780 and Volume 3, AD-772 782.

Abstract: Volume II covers the proposed system approach, functional requirements, supporting studies, and feasibility hardware specifications.

Descriptors: *Landing aids, Microwave equipment, Systems engineering, Electronic equipment, Scanning, C band, K band, Specifications, Multipath transmission

Identifiers: *Microwave landing systems, MLS(Microwave Landing Systems), FAA

AD-772 781/1 NTIS Prices: PC A17/MF A01

Microwave Landing System (MLS) Development Plan as Proposed by Texas Instruments, Inc. During the Technique Analysis and Contract Definition Phase of the National MLS Development Program. Volume III. Portion of System Performance Summary and Signal Format Summary

Texas Instruments Inc Dallas*Federal Aviation Administration, Washington, D.C. (347650)
C4075C3 Fld: 17G, 76D, 85A GRAI7505
27 Sep 72 374p
Contract: DOT-FA72WA-2802
Project: FAA-075-325-013
Monitor: FAA-RD-74-170-3
See also Volume 2, AD/A-003 375 and Volume 4, AD/A-003-377.

Abstract: Contents: Updated civil/military operational requirements; Functional requirements summary; Conceptual system operation; MLS configurations; and Signal format summary.

Descriptors: *Landing aids, Instrument landings, Microwaves, Systems engineering, C band, Ku band, Signals, Performance(Engineering)

Identifiers: DOT/4IZ/ID, *Microwave landing systems, Instrument landing systems, NTISDODFAA, NTISDOT

AD/A-003 376/1ST NTIS Prices PC A16/MF A01

Microwave Landing System (MLS) Development Plan as Proposed by ITT/Gilfillan During the Technique Analysis and Contract Definition Phase of the National MLS Development Program. Volume I. Technique Analysis Program

ITT Gilfillan Inc Van Nuys Calif*Federal Aviation Administration, Washington, D.C. Systems Research and Development Service. (388599)
C3465H3 Fld: 17G, 85A GRAI7422
27 Sep 72 466p
Contract: DOT-FA72WA-2805
Monitor: FAA-RD-74-118-Vol-1
See also Volume 3, AD-784 344

Abstract: The report details technical aspects of ITT/Gilfillan proposed hardware development. Volume I discusses the Technique Analysis Program.

Descriptors: *Landing aids, Microwave equipment, Engineering, C band, Doppler systems, Multipath transmission, Systems analysis, Life cycles, Costs, Site selection, Compatibility, Signals

Identifiers: *Microwave landing systems, Technique analysis, NTISDODFAA, NTISDOT

AD-784 609/0 NTIS Prices: PC A20/MF A01

Microwave Landing System (MLS) Development Plan as Proposed by AIL During the Technique Analysis and Contract Definition Phase of the National MLS Development Program. Part 1.0 Volume 1.2 Book II. Post TACD Development Plan

All Deer Park N Y (404967)
C2361F2 Fld: 17G, 85A GRAI7407
27 Sep 72 373p
Contract: DOT-FA72WA-2800
Monitor: FAA-RD-73-166-Vol-1.2-2
See also AD-772 595.

Abstract: The report covers plans for feasibility demonstration, prototype systems development, and limited production option.

Descriptors: *Landing aids, Microwave equipment, Ku band, C band, Scanning, Feasibili*y studies, Antennas, Systems analysis

Identifiers: *Microwave landing systems, FAA

AD-773 675/4 NTIS Prices: PC E11/MF A01

Microwave Landing System (MLS) Development Plan as Proposed by AIL During the Technique Analysis and Contract Definition Phase of the National MLS Development Program. Part 3.0 Volume 3.1 Book 1. Compilation of Critical Technical Area Reports

All Deer Park N Y (404967)
C2263J1 Fld: 17G, 85A GRAI7406
27 Sep 72 344p
Contract: DOT-FA72WA-2800
Project: FAA-075-325-013
Monitor: FAA-RD-73-166-Vol-3.1-1
See also AD-772 595 and AD-772 597.

Abstract: Part 3.0, Volume 3.1, Books I and II present analysis of Critical Technical Areas.

Descriptors: *Landing aids, Microwave equipment, Systems engineering, C band, K band, Scanning, Engineering, Multipath transmission, Electronic equipment

Identifiers: *Microwave landing systems, MLS(Microwave Landing Systems), FAA

AD-772 596/3 NTIS Prices: PC A15/MF A01

Microwave Landing System (MLS) Development Plan as Proposed by Texas Instruments, Inc. During the Technique Analysis and Contract Definition Phase of the National MLS Development Program. Volume IV. Appendix D, Supplementary Military Systems Analysis

Texas Instruments Inc Dallas*Federal Aviation Administration, Washington, D C. (347650)
C4075C4 Fld: 17G, 76D, 85A GRAI7505
27 Sep 72 160p
Contract: DOT/FA72WA-2802
Project: FAA-075-325-013
Monitor: FAA-RD-74-170-4
See also Volume 3, AD/A-003 376 and Volume 5, AD/A-003 378.

Abstract: The appendix presents the detailed supporting analyses for accuracy, range, stabilization, etc. of the proposed military configurations. The summarized results of these analyses were presented as part of the general system description.

Descriptors: *Landing aids, Instrument landings, Microwaves, Systems engineering, C band, Ku band, Military applications, Performance(Engineering)

Identifiers: DOT/4IZ/ID, *Microwave landing systems, Instrument landing systems, NTISDODFAA, NTISDOT

AD/A-003 377/9ST NTIS Prices: PC A08/MF A01

Microwave Landing System (MLS) Development Plan as Proposed by Raytheon during the Technique Analysis and Contract Definition Phase of the National MLS Development Program. Volume VI. Supporting Studies Appendices D Through N

Raytheon Co Wayland Mass (298350)
227212 Fld: 17G, 85A GRAI7406
Sep 72 576p
Contract DOT-FA72WA-2803
Monitor FAA-RD-73-150-6
See also Volume 1, AD-772 780.

Abstract: ;Contents: Propagation studies; Computer simulation task report; Bench signal format verification; EMC and interference test set-up; DME circuit development; Reliability studies; DME capacity analysis; Aux-B filter for range and velocity estimation; Signal format-supporting analyses; ACLS-detailed task report; Siting studies.

Descriptors: *Landing aids, Microwave equipment, Multipath transmission, C band, K band, Scanning, Computerized simulation, Electromagnetic compatibility, Distance measuring equipment, Reliability(Electronics), Electronic equipment, Signal processing, Site selection

Identifiers: *Microwave landing systems, MLS(Microwave Landing Systems), FAA

AD-772 785/2 NTIS Prices: PC A25/MF A01

Microwave Landing System (MLS) Development Plan as Proposed by Bendix Corporation During the Technique Analysis and Contract Definition Phase of the National MLS Development Program. Volume III. Notes MLS-BCD-28 through 38

Bendix Corp Baltimore Md*Federal Aviation Administration, Washington, D.C. Systems Research and Development Service. (389220)
C4424K4 Fld: 17G, 85A GRAI7510
27 Sep 72 250p
Contract: DOT-FA72WA-2801
Monitor: FAA-RD-74-152-3
See also Volume 2, AD/A-006 993 and Volume 4, AD/A-006 972.

Abstract: The report details technical aspects of Bendix proposed MLS hardware development. Volume III contains technical notes MLS-BCD-28 through 38.

Descriptors: *Landing aids, Microwave equipment, Scanning, Beams(Radiation), Coding, Angles, Operation, Planning, Clutter, Interference

Identifiers: *Microwave landing systems, DOT/4IZ/ID, NTISDODFAA, NTISDOT

AD/A-006 971/6ST NTIS Prices PC A11/MF A01

Microwave Landing System (MLS) Development Plan as Proposed by AIL during the Technique analysis and Contract Definition Phase of the National MLS Development Program. Part 1.0. Volume 1.1. Technique Analysis Program

AIL Deer Park N Y (404967)
C226313 Fld: 17G, 85A GRAI7406
27 Sep 72 341p
Contract: DOT-FA72WA-2800
Project: FAA-075-325-013
Monitor: FAA-RD-73-166-Vol-1-1
See also AD-772 598.

Abstract: The report details technical aspects of AIL proposed MLS hardware development. Part 1.0 Volume 1.1 discusses the technique analysis. Part 1.0 Volume 1.2, Books I and II cover plans for feasibility demonstration, prototype systems development, and limited production option. Part 3.0, Volume 3.1, Books I and II present analysis of Critical Technical Areas. Part 3.0, Volume 3.2 covers the System Technique Summary, Functional Requirements Summary, and Detailed Feasibility Hardware Specifications. (Author)

Descriptors: *Landing aids, Microwave equipment, Scanning, Systems engineering, C band, K band, Mechanical scanning, Electronic equipment, Multipath transmission, Engineering

Identifiers: *Microwave landing systems, MLS(Micorwave Landing Systems), FAA

AD-772 594/8 NTIS Prices: PC A15/MF A01

Microwave Landing System (MLS) Development Plan as Proposed by Hazeltine Corporation during the Technique Analysis and Contract Definition Phase of the National MLS Developmental Program. Volume III. Data Formal Analog Computer Studies

Hazeltine Corp Greenlawn N Y (406971)
C2853J2 Fld: 17G, 85A GRAI7413
27 Sep 73 223p
Rept No: 10926-Vol-3
Contract: DOT-FA72WA-2804
Project: FAA-075-325-013
Monitor: FAA-RD-73-185-3
See also Volume 2, AD-778 118.

Abstract: Volume III includes Report on MLS Data Formal Analog Computer Studies, and Preliminary Receiver/Processor Output Recommendations. (Modified author abstract)

Descriptors: *Landing aids, Microwave equipment, Analog simulation, Automatic pilots, Signals, Doppler systems

Identifiers: *Microwave landing systems, FAA

AD-778 140/4 NTIS Prices: PC A10/MF A01

Microwave Landing System (MLS) Development Plan as Proposed by Texas Instruments, Inc. During the Technique Analysis and Contract Definition Phase of the National MLS Development Program. Volume VII. Appendixes E12 through E20

Texas Instruments Inc Dallas*Federal Aviation Administration, Washington, D.C. (347650)
C4075D3 Fld: 17G, 76D, 85A GRAI7505
27 Sep 72 395p
Contract: DOT-FA72WA-2802
Project: FAA-075-325-013
Monitor: FAA-RD-74-170-7
See also Volume 5, AD/A-003 378 and Volume 8, AD/A-003 381.

Abstract: ;Contents: Study of the spectrum validation circuit; Study of the pulse spectrum; Measurements of a spectrum validation circuit; Angle system mockup; Tests on dme receiver model; C-band azimuth antenna study supplementary data; Receiver/decoder detailed analysis; Monitoring studies; Choice of agc for dme ground transponder; If amplifier transit time variations; DME identification study.

Descriptors: *Landing aids, Microwaves, Instrument landings, C band, Ku band, Distance measuring equipment, Spectra, Scanning, Beams(Radiation), Angles, Antennas, Radio receivers, Decoding, Monitoring, Automatic gain control, Intermediate frequency amplifiers, Identification systems

Identifiers: DOT/4IZ/ID, *Microwave landing systems, Instrument landing systems, NTISDODFAA, NTISDOT

AD/A 003 380/3ST NTIS Prices: PC A17/MF A01

Microwave Landing System (MLS) Development Plan as Proposed by Raytheon During the Technique Analysis and Contract Definition Phase of the National MLS Development Program. Volume III. 1.1.1 Performance Validation

Raytheon Co Wayland Mass (29P350)
C2291J4 Fld: 17G, 85A GRAI7406
Sep 72 362p
Contract: DOT-FA72WA-2803
Monitor: FAA-RD-73-150-3
See also Volume 2, AD-772 781 and Volume 3a, AD-772 782

Abstract: Volume III discusses multipath, power/error budgets, hardware realization, and system integrity.

Descriptors: *Landing aids, Microwave equipment, Multipath transmission, Scanning, Accuracy, Power, Antennas, C band, K band, Electronic equipment, Reliability(Electronics)

Identifiers: *Microwave landing systems, MLS(Microwave Landing Systems), FAA

AD-773 223/3 NTIS Prices: PC A16/MF A01

Microwave Landing System (MLS) Development Plan as Proposed by AIL During the Technique Analysis and Contract Definition Phase of the National MLS Development Program. Part 1.0 Volume 1.2 Book 1. Post TACD Development Plan

AIL Deer Park N Y (404967)
C2263I4 Fld: 17G, 85A GRAI7406
27 Sep 72 409p
Contract: DOT-FA72WA-2800
Project: FAA-075-325-013
Monitor: FAA-RD-73-166-Vol-1:2-1
See also AD-772 596.

Abstract: Part 1.0 Volume 1.2, Books I and II cover plans for feasibility demonstration, prototype systems development, and limited production option.

Descriptors: *Landing aids, Microwave equipment, Feasibility studies, C band, K band, Scanning, Multipath transmission, Electronic equipment, Engineering, Systems engineering

Identifiers: *Microwave landing systems, MLS(Microwave Landing Systems), FAA

AD-772 595/5 NTIS Prices: PC A18/MF A01

Microwave Landing System (MLS) Development Plan as Proposed by AIL During the Technique Analysis and Contract Definition Phase of the National MLS Development Program. Part 3.0 Volume 3.2 Appendix A. System Technique Summary. Appendix B. Functional Requirements Summary. Appendix C. Detailed Feasibility Hardware Specifications

AIL Deer Park N Y (404967)
C2263J3 Fld: 17G, 85A GRAI7406
27 Sep 72 98p
Contract: DOT-FA72WA-2800
Project: FAA-075-325-013
Monitor: FAA-RD-73-166-Vol-3:2
See also AD-772 595 and AD-772 597.

Abstract: Part 3.0, Volume 3.2 covers the System Technique Summary, Functional Requirements Summary, and Detailed Feasibility Hardware Specifications.

Descriptors: *Landing aids, Microwave equipment, Systems engineering, C band, K band, Scanning, Specifications, Electronic equipment, Multipath transmission

Identifiers: *Microwave landing systems, MLS(Microwave Landing Systems), FAA

AD-772 598/9 NTIS Prices: PC A05/MF A01

Microwave Landing System (MLS) Development Plan as Proposed by Texas Instruments, Inc. During the Technique Analysis and Contract Definition Phase of the National MLS Development Program. Volume VIII. Appendix F1

Texas Instruments Inc Dallas;Federal Aviation Administration, Washington, D.C. (347650)
C4075D4 Fld: 17G, 76D, 85A GRAI7505
27 Sep 72 296p
Contract: DOT-FA-72WA-2802
Project: FAA-075-325-013
Monitor: FAA-RD-74-170-8
See also Volume 7, AD/A-003 380 and Volume 9, AD/A-003 382.

Abstract: The volume presents the angle data rate study of the flight factor studies.

Descriptors: *Landing aids, Microwaves, Instrument landings, C band, Ku band, Angles, Data rate

Identifiers: DOT/4IZ/ID, *Microwave landing systems, Instrument landing systems, NTISDODFAA, NTISDOT

AD/A-003 381/1ST NTIS Prices: PC A13/MF A01

Microwave Landing System (MLS) Development Plan as Proposed by Bendix Corporation During the Technique Analysis and Contract Definition Phase of the National MLS Development Program. Volume V. Notes MLS-BAD-12 through 28, 30-34, MLS-NCO-6-8, MLS-RLD-5-14

Bendix Corp Baltimore Md*Federal Aviation Administration, Washington, D.C. Systems Research and Development Service. (389220)
C4424L2 Fld: 17G, 85A GRAI7510
27 Sep 72 630p
Contract: DOT-FA72WA-2801
Monitor: FAA-RD-74-152-5
See also Volume 4, AD/A-006 972, and Volume 6, AD/A-006 974.

Abstract: The report details technical aspects of Bendix proposed MLS hardware development. Volume V contains technical notes MLS-BAD-12 through 28, 30 through 34, MLS-NCO-6 through 8, and MLS-RLD-5 through 14.

Descriptors: *Landing aids, Microwave equipment, Planning, Avionics, Data processing equipment, Antennas, Processing equipment, Antenna arrays, Scanning, Waveguide couplers, Control systems, Beams(Radiation)

Identifiers: *Microwave landing systems, DOT/412/ID, NTISDODFAA, NTISDOT

AD/A-006 973/2ST NTIS Prices: PC E09/MF A01

Microwave Landing System (MLS) Development Plan as Proposed by Raytheon during the Technique Analysis and Contract Definition Phase of the National MLS Development Program. Volume IIIa

Raytheon Co Wayland Mass (298350)
C2272H3 Fld: 17G, 85A GRAI7406
Sep 72 351p
Contract: DOT-FA72WA-2803
Monitor: FAA-RD-73-150-3a
See also Volume 2, AD-772 781 and Volume 3, AD-773 223.

Abstract: Volume IIIA treats DME, transportable systems, pilot factors, aircraft interface, carrier landing requirements, functional requirements, and signal format.

Descriptors: *Landing aids, Microwave equipment, Distance measuring equipment, Electromagnetic compatibility, Manportable equipment, K band, Multipath transmission, C band, Scanning, Interfaces

Identifiers: *Microwave landing systems, MLS(Microwave Landing Systems), FAA

AD-772 782/9 NTIS Prices: PC A16/MF A01

Microwave Landing System (MLS) Development Plan as Proposed by Bendix Corporation During the Technique Analysis and Contract Definition Phase of the National MLS Development Program. Volume II. Indexes of Technical Notes

Bendix Corp Baltimore Md*Federal Aviation Administration, Washington, D.C. Systems Research and Development Service (389220)
C4425E2 Fld: 17G, 85A GRAI7510
27 Sep 72 337p
Contract: DOT-FA72WA-2801
Monitor: FAA-RD 74-152-2
See also Volume 1, AD/A-006 970, and Volume 3, AD/A-006 971.

Abstract: This report details technical aspects of Bendix proposed MLS hardware development. Volume II contains indexes of technical notes, power and error budgets, and other material.

Descriptors: *Landing aids, Microwave equipment, C band, Ku band, Scanning, Beams(Radiation), Antennas, Power, Processing equipment, Planning

Identifiers: *Microwave landing systems, DOT/412/ID, NTISDODFAA, NTISDOT

AD/A-006 993/0ST NTIS Prices PC A15/MF A01

Microwave Landing System (MLS) Development Plan as Proposed by Raytheon during the Technique Analysis and Contract Definition Phase of the National MLS Development Program. Volume IV. System Considerations 1.1.2 Through 1.1.5

Raytheon Co Wayland Mass (298350)
C2272H4 Fld: 17G, 85A GRAI7406
Sep 72 155p
Contract: DOT-FA72WA-2803
Monitor: FAA-RD-73-150-4
See also volume 3a, AD-772 782, Volume 5, AD-772 784.

Abstract: Volume IV relates studies and analyses supporting the Raytheon proposed MLS development.

Descriptors: *Landing aids, Microwave equipment, Systems engineering, Electromagnetic compatibility, Performance(Engineering), Scanning, Electronic equipment, C band, K band, Multipath transmission

Identifiers: *Microwave landing systems, *MLS(Microwave Landing Systems), FAA

AD-772 783/7 NTIS Prices: PC A08/MF A01

Microwave Landing System (MLS) Development Plans as Proposed by Raytheon during the Technique Analysis and Contract Definition Phase of the National MLS Development Program. Volume V. Post TA/CD Plans Management Performance

Raytheon Co Wayland Mass (298350)
C2272I1 Fld: 17G, 85A GRAI7406
Sep 72 277p
Contract: DOT-FA72WA-2803
Monitor: FAA-RD-73-150-5
See also Volume 4, AD-772 783, Volume 6, AD-772 785.

Abstract: Volume V describes the Raytheon plans for feasibility demonstration, prototype development, and limited production. Certain sections of this volume not relating to the Raytheon technique analysis, system description, or development plans are not included.

Descriptors: *Landing aids, Microwave equipment, Feasibility studies, Electronic equipment, Specifications, Reliability(Electronics), C band, K band, Scanning, Maintainability, Multipath transmission

Identifiers: *Microwave landing systems, MLS(Microwave Landing Systems), FAA

AD-772 784/5 NTIS Prices: PC A13/MF A01

Microwave Landing System (MLS) Development Plan as Proposed by Texas Instruments, Inc. During the Technique Analysis and Contract Definition Phase of the National MLS Development Program. Volume VI. Appendixes E3 through E11

Texas Instruments Inc Dallas*Federal Aviation Administration, Washington, D.C. (347650)
C4075D2 Fld: 17G, 76D, 85A GRAI7505
27 Sep 72 611p
Contract: DOT-FA72WA-2802
Project: FAA-075-325-013
Monitor: FAA-RD-74-170-6
See also Volume 5, AD/A-003 378 and Volume 7, AD/A-003 380.

Abstract: Contents: Reflections study; Shadowing analysis; Compatibility; Degradation; Near field effects analysis; Electronic scan antenna study; Airborne antenna study; Angle system accuracy; DME system accuracy; Convex runways

Descriptors: *Landing aids, Microwaves, Instrument landings, C band, Ku band, Angles, Measurement, Reflection, Shadows, Compatibility, Degradation, Near field, Antenna arrays, Computer programs, Electronic scanners, Aircraft antennas, Accuracy, Distance measuring equipment, Runways, Attenuation

Identifiers: DOT/415/ID, *Microwave landing systems, Instrument landing systems, NTISDOTFAA, NTISDOT

AD/A-003 379/5ST NTIS Prices: PC E09/MF A01

Microwave Landing System (MLS) Development Plan as Proposed by Texas Instruments, Inc. During the Technique Analysis and Contract Definition Phase of the National MLS Development Program. Volume 2. Performance Validation, System Trades and System Compatibility

Texas Instruments Inc Dallas*Federal Aviation Administration, Washington, D.C. (347650)
C4075C2 Fld: 17G, 76D, 85A GRAI7505
27 Sep 72 270p
Contract: DOT-FA72-WA-2802
Project: FAA-075-325-013
Monitor: FAA-RD-74-170-2
See also Volume 1, AD/A-003 374 and Volume 3, AD/A-003 376.

Abstract: The volume reports the analytical and experimental studies performed to resolve the critical technical issues; the system trade-off studies and system rationale; and the system compatibility studies.

Descriptors: *Landing aids, Instrument landings, Systems engineering, Microwaves, C band, Ku band, Performance(Engineering), Trade off analyses, Compatibility

Identifiers: DOT/4IZ/ID, *Microwave landing systems, Instrument landing systems, NTISDODFAA, NTISDOT

AD/A-003 375/3ST NTIS Prices: PC A12/MF A01

Microwave Landing System (MLS) Development Plan as Proposed by Bendix Corporation During the Technique Analysis and Contract Definition Phase of the National MLS Development Program. Volume IV. Notes MLS-BCD-40 through 45, 46 addendum, 48, 49, 52-54, 57, 58, 60-70, 72-74

Bendix Corp Baltimore Md*Federal Aviation Administration, Washington, D.C. Systems Research and Development Service. (389220)
C4424L1 Fld: 17G, 85A GRAI7510
27 Sep 72 691p
Contract: DOT-FA72WA-2801
Monitor: FAA-RD-74-152-4
See also Volume 3, AD/A-006 971 and Volume 5, AD/A-006 973.

Abstract: The report details technical aspects of Bendix proposed MLS hardware development. Volume IV contains technical notes MLS-BCD-40 through 45, 46 addendum, 48 and 49, 52 through 54, 57 and 58, 60 through 70, and 72 through 74.

Descriptors: *Landing aids, Microwave equipment, Specifications, Scanning, Beams(Radiation), Multipath transmission, Errors, Antennas, Power, Clutter, Planning

Identifiers: *Microwave landing systems, DOT/4IZ/ID, NTISDODFAA, NTISDOT

AD/A-006 972/4ST NTIS Prices: PC E09/MF A01

Microwave Landing System (MLS) Development Plan as Proposed by Texas Instruments, Inc. During the Technique Analysis and Contract Definition Phase of the National MLS Development Program. Volume I. Index and System Development Highlights

Texas Instruments Inc Dallas*Federal Aviation Administration, Washington, D.C. (347650)
C4075C1 Fld: 17G, 76D, 85A GRAI7505
27 Sep 72 67p
Contract: DOD-FA72WA-2802
Project: FAA-075-325-013
Monitor: FAA-RD-74-170-1
See also Volume 2, AD/A-003 375.

Abstract: ;Contents: Requirements and configuration types; Basic system concepts; Implementation; System growth potential; Summary.

Descriptors: *Landing aids, Instrument landings, Systems engineering, Microwaves, C band, Ku band, Scanning, Beams(Radiation)

Identifiers: DOT/4IZ/ID, *Microwave landing systems, Instrument landing systems, NTISDODFAA, NTISDOT

AD/A-003 374/6ST NTIS Prices: PC A04/MF A01

Microwave Landing System (MLS) Development Plan as Proposed by Texas Instruments, Inc. During the Technique Analysis and Contract Definition Phase of the National MLS Development Program. Volume IX. Appendixes F2 and F3

Texas Instruments Inc Dallas*Federal Aviation Administration, Washington, D.C. (347650)
C4075E1 Fld: 17G, 76D, 85A GRAI7505
27 Sep 72 308p
Contract: DOT-FA72WA-2802
Project: FAA-075-325-013
Monitor: FAA-RD-74-170-9
See also Volume 8, AD/A-003 381 and Volume 1, AD/A-003 374.

Abstract: :Contents: Airborne interface and pilot factors study; ATC and navigation system interfaces.

Descriptors: *Landing aids, Microwaves, Instrument landings, C band, Ku band, Interfaces, Man machine systems, Air traffic control systems, Navigation

Identifiers: DOT/4IZ/ID, *Microwave landing systems, Instrument landing systems, NTISDODFAA, NTISDOT

AD/A-003 382/9ST NTIS Prices: PC A14/MF A01

Microwave Landing System (MLS). Phase III (Basic Narrow and Small Community Configurations). Volume II

Bendix Corp Baltimore MD Communications Div (402895)

Final rept.
G0885F4 Fld: 17G, 1E, 9B, 85A GRAI8012
Jan 78 231p
Rept No: BCD-R-2801-1-VOL-2
Contract: DOT-FA72WA-2801
See also Volume 1, AD-A081 233.

Abstract: Appendix A describes the design considerations that were applied to the Rotman lenses used in a Basic (Narrow) and a Small Community configuration for the Microwave Landing System. Appendices B thru E contain a detailed reliability and maintainability analysis of the two configurations including the airborne equipments. (Author)

Descriptors: *Microwave landing systems, *Antenna radiation patterns, Lens antennas, Computerized simulation, Reliability, Maintainability, Safety, Human factors engineering, Ground support equipment, Checkout procedures, Test methods

Identifiers: Rotman lenses, NTISDODXA

AD-A081 133/1 NTIS Prices: PC A11/MF A01

Microwave Landing System (MLS). Phase III. (Basic Narrow & Small Community Configurations). Volume I

Bendix Corp Baltimore MD Communications Div (402895)

Final rept.
G0892G3 Fld 17G, 1E, 85A GRAI8012
Jun 78 357p
Rept No BCD-R-2801-1-VOL-1
Contract DOT-FA72WA-2801
See also Volume 1, AD-A081 133.

Abstract: This report describes the design, fabrication, and testing of a Basic (Narrow) and a Small Community configuration for the Microwave Landing System (MLS). A detailed description of the ground and airborne subsystems and equipments, and a summary of flight test data taken at the National Aviation Facilities Experimental Center (NAFEC) are presented. The sitings of the two configurations at NAFEC are described. A summary of the reliability and maintainability analysis is given; the detailed R&M analysis is presented in Vol. II. Appendices B thru E. (Author)

Descriptors: *Microwave landing systems, Electronic scanners, Radio beams, Clutter, Radio interference, Electronic equipment, Antennas, Circuit analysis, Antenna radiation patterns, Site selection, Reliability, Maintainability

Identifiers: DOT/4IZ/ID, NTISDODXA

AD-A081 233/9 NTIS Prices: PC A16/MF A01

Microwave Scanning Beam Landing System Compatibility and Performance: Engineering Analyses 75-1 and 75-2

Airborne Instruments Lab., Farmingdale, N.Y.

Final Report.
D3173C4 Fld: 17G, 85A, 76D, 84C STAR1516
Apr 77 478p
Rept No: NASA-CR-151428
Contract: NAS9-14543
Monitor: 18

Abstract: The microwave scanning beam landing system (MSBLS) is the primary position sensor of the Orbiter's navigation subsystem during the autoland phase of the flight. Portions of the system are discussed with special emphasis placed on potential problem areas as referenced to the Orbiter's mission. Topics discussed include system compatability, system accuracy, and expected RF signal levels. A block and flow diagram of MSBLS system operation is included with a list of special tests required to determine system performance.

Descriptors: *Horizontal spacecraft landing, *Microwave landing systems, *Space shuttle orbiters, *Systems compatibility, Automatic landing control, Block diagrams, Ground support systems, Spacecraft guidance

Identifiers: NTISNASA

N77-25133/8ST NTIS Prices: PC A21/MF A01

Microwave Scanning Beam Landing System, Ground Station: Performance Test Report. Volume 1: Executive Summary

Cutler-Hammer, Inc., Farmingdale, N.Y. AIL Div.
E0814A1 Fld: 17G, 85A STAR1605
20 Aug 77 17p
Rept No: NASA-CR-151582; JSC-11525-V-1
Contract: NAS9-14543
Monitor: 18

Abstract: Conclusions and recommendations are presented based on data evaluation as developed to date and detailed in Engineering Test Summary Reports.

Descriptors: *Ground stations, *Microwave scanning beam landing system, *Performance tests, Aircraft landing, Landing instruments, Microwave landing systems

Identifiers: NTISNASA

N78-14021/7ST NTIS Prices: PC A02/MF A01

Modeling and Simulation of Avionics Systems and Command, Control and Communications Systems

Advisory Group for Aerospace Research and Development Neuilly-sur-Seine (France) (400043)

Conference proceedings.
G1171L3 Fld: 9C, 7B, 51C, 51E, 45C GRA18014
Jan 80 555p
Rept No: AGARD-CP-268
Presented at a Meeting of the Avionics Panel held in Paris, France, 15-19 Oct 79.

Abstract: These Proceedings consist of the papers and discussions presented at the Avionics Panel Meeting on Modeling and Simulation held in Paris, France, October 1979. Papers were divided as follows: 6-Tutorial, 8-C3 System Simulation, 5-Airborne Surveillance System Simulation, 5-Manned Flight Simulators, 4-Identification, Communiction Navigation, and Countermeasure Simulation, and 11 on Avionics System Simulation. (Author)

Descriptors: *Avionics, *Command and control systems, *Telecommunication, Flight simulation, Flight simulators, Manned, IFF systems, Mathematical models, Countermeasures, Electronic aircraft, Automatic tracking, Man machine systems, Aircraft landings, Vertical takeoff aircraft, Microwave landing systems, Symposia, Air defense

Identifiers: *Foreign Technology, NATO furnished, Joint Tactical Information Distribution System, Aerial surveillance, *Meetings, NTISDODXA, NTISFNFR

AD-A082 012/6 NTIS Prices: PC A24/MF A01

National Plan for Development of the Microwave Landing System

Federal Aviation Administration Washington D C (403270)
A3303K3 Fld: 17G, 18, 51F GRA17202
Jul 71 107p
Prepared in cooperation with Department of Defense, Washington, D. C. and National Aeronautics and Space Administration, Washington, D. C.

Abstract: A plan for the development of a new civil/military microwave landing system (MLS) is presented. It delineates the five (5) year program of integrated activity deemed necessary to provide a MLS that meets the wide range of user operational requirements set down by RTCA SC-117. Included in the plan are two interdependent and complementary activities. (1) an industry oriented systems development program designed to produce prototype equipments for flight test and evaluation and, finally, production specifications at the earliest possible data; and (2) a concurrent series of supporting government programs, to be undertaken by DOT/DOD/NASA, which will include validation efforts independent of the industry program, investigations of sub-system concepts and techniques, performance of flight tests and system evaluation efforts, and application of the microwave guidance system to the requirements of the individual users. Special emphasis is placed on the need for expeditious development of a MLS basic design that will utilize a standard signal structure and feature highly flexible modular building-block concepts that will facilitate its being appropriately configured to meet the complex requirements for full scale all weather automatic landings on the one hand, and the lesser requirements of general aviation users on the other. (Author)

Descriptors: (*Air traffic control systems, Microwave frequency), (*Landing aids, Advanced planning), Management planning, Terminal guidance

Identifiers: *Microwave landing systems, MLS(Microwave Landing Systems)

AD-733 268 NTIS Prices: PC A06/MF A01

National Plan for Development of the Microwave Landing System - June 1978 Update

Federal Aviation Administration Washington D C Systems Research and Development Service (340170)
E2631H3 Fld: 17G, 76D, 85A GRA17825
Jun 78 98p
Rept No: FAA-ED-07-2A
Monitor: 18

Abstract: An updated plan for the development of an interoperable civil/military microwave landing system (MLS) is presented. The original plan delineated a five (5) year program of integrated activity deemed necessary to provide a MLS that meets the wide range of user operational requirements. The substance of the work and the goals achieved under the initial plan have occurred essentially as planned except for the schedule. The TRSB (Time Reference Scanning Beam) technique selection was made about one year later than originally planned and considerable time and resources were devoted to ICAO activities that were not initially envisioned. A major milestone in the MLS program was achieved in April 1978 at the All Weather Operations Divisional meeting of ICAO, when the U.S. TRSB system was selected to be the standard system for international civil use as a replacement for ILS.

Descriptors: *Microwave landing systems, Civil aviation, Military applications, Global, Planning, Long range(Time), Prototypes

Identifiers: Development, NTISDODXA

AD-A058 548/9ST NTIS Prices: PC A05/MF A01

Potential Benefits to the Scanning Beam Microwave Landing System

Urban Systems Research and Engineering Inc Cambridge Mass*Federal Aviation Administration, Washington, D.C. Office of Aviation Policy and Plans. (407601)

Final rept.
C3902K3 Fld: 17G, 76D GRAI7502
Mar 73 28p
Contract: DOT-FA72WA-3142
Monitor: FAA-AAV-73-2

Abstract: The report examines the potential benefits of a scanning beam microwave landing system (MLS). The weather benefits estimated in Potential Economic Benefits of Fog Dispersal in the Terminal Area are examined using sensitivity analysis. This analysis reveals that the most important variable to refine in improving the benefit estimates is the value of passenger time. It is then recommended that passenger interviews are the best way to obtain the information necessary to refine the estimate of the value of time. Six areas of non-weather benefit which are frequently attributed to a MLS are examined. Facilities and circumstances which are needed in addition to a MLS are identified.

Descriptors: *Landing aids, Microwave equipment, Beams(Radiation), Scanning, Benefits

Identifiers: *Microwave landing systems, Sensitivity analysis, NTISDODFAA, NTISDOT

AD/A-001 347/4SL NTIS Prices: PC A03/MF A01

Status of the Federal Aviation Administration's Microwave Landing System

General Accounting Office, Washington, DC. Procurement and Systems Acquisition Div.

Report to the Congress.
F021311 Fld: 17G, 85A* GRAI7903
19 Oct 78 53p*
Rept No: PSAD-78-149
Monitor: 18

Abstract: The Federal Aviation Administration's new common civil/military microwave landing system is about 5 years behind schedule and research and development will cost between $182 to $192 million--approximately $90 to $100 million more than originally estimated. Large amounts of money are still being invested for ground equipment for the existing system. Recognizing these continued investments, along with the probable extension to 1995 of instrument landing systems at international airports, existing instrument landing systems at U.S. domestic airports should be continued in accordance with a mutually agreeable microwave landing system implementation plan.

Descriptors: *Instrument landing systems, Microwave equipment, Reviews, Systems analysis, Evaluation, Costs, Performance

Identifiers: *Microwave landing systems, NTISGAO

PB-287 275/2ST NTIS Prices: PC A04/MF A01

Technical Progress in the U.S. Development of a Microwave Landing System

Federal Aviation Administration Washington D C Systems Research and Development Service (340170)

Progress rept. Jul 71-Jun 74.
C7783J2 Fld: 17G, 85A, 76D GRA17626
Sep 76 223p
Rept No: FAA-RD-74-187
Monitor: 18
Sponsored in part by Department of Defense, Washington, D.C. and National Aeronautics and Space Administration, Washington, D.C. See also report dated Jul 71, AD-733 268

Abstract: The document reports the technical progress that has been made from July 1971 to July 1974 in the U.S. development of a Microwave Landing System. This MLS development is a joint DOT/DOD/NASA effort based upon the National Plan for Development of the Microwave Landing System, dated July 1971. Phase I Technique Analysis and Contract Definition has been completed. Phase II, Feasibility Demonstration is nearing completion. The next step is an evaluation and the selection of an MLS technique and optimum signal format to allow the start of Phase III, Prototype Development.

Descriptors: *Microwave landing systems, Systems approach, Systems engineering

Identifiers: NTISDODFAA, NTISDOTFAA, NTISNASA

AD-A031 150/6ST NTIS Prices: PC A10/MF A01

THE NATIONAL AIRSPACE SYSTEM 1965: MAJOR FACILITIES; FUNCTIONS; MAINTENANCE COSTS

Systems Research and Development Service Federal Aviation Agency Washington D C (000000)

Interim rept.
1693A4 USGRDR6510
Mar 65 2p
Rept No: RD-65-25
Project: 142 421 01A

Abstract: Contents (largely systems and facilities): 100 Air navigation facilities UHF/VHF 150 Air navigation facilities L/MF 200 Instrument land systems 300 Approach light systems 400/420 Light beacons and fields 500 Air route traffic control centers and associated facilities 550 Long-range surveillance radar facilities 600 Air traffic control tower facilities 650 Terminal area radar facilities 670 Military approach control facilities 700 Flight service stations and associated facilities 800 International flight service stations and associated facilities 900 Secondary facilities - housing, utilities and miscellaneous Equipments used for facility class determination Computation of maintenance costs.

Descriptors: (*TERMINAL FLIGHT FACILITIES, UNITED STATES), ULTRAHIGH FREQUENCY, VERY HIGH FREQUENCY, LOW FREQUENCY, MICROWAVE FREQUENCY, INSTRUMENT LANDINGS, APPROACH LIGHTS, BEACONS, LANDING FIELDS, AIR TRAFFIC CONTROL SYSTEMS, TOWERS, RADAR STATIONS, HOUSING, COSTS, MAINTENANCE

AD-613 367 CFSTI Price: PC A02

The 5TH Meeting of the AD Hoc Panel on Terminal Configured Vehicles

National Aeronautics and Space Administration, Langley Research Center Langley Station, Va
E0614G2 Fld: 1B, 17G, 51B, 76C STAR1603
1977 206p
Rept No: NASA-TM-78332
Monitor: 18
Conf-Meeting Held at Hampton, VA., 14-15 Sep. 1977.

Abstract: A report of the fifth meeting of the NASA Research and Technology Advisory Council, Ad Hoc panel on Terminal Configured Vehicles is presented. Some of the following topics were discussed: (1) microwave landing systems; (2) whole word computer system status; (3) flight path angle control; (4) VTOL approaches and landing technology; and (5) simulation study in wind shear.

Descriptors: *Microwave landing systems, *Terminal configured vehicle program, *Vertical takeoff aircraft, Proceedings, Aircraft landing, Flight paths, Flight simulation, Wind shear

Identifiers: *Meetings, NTISNASA

N78-12000/3ST NTIS Prices: PC A10/MF A01

TRSB Microwave Landing System Demonstration Program at Jorge Newbery Aeroparque Buenos Aires, Argentina

National Aviation Facilities Experimental Center Atlantic City N J (240550)

Final rept.
E1695F3 Fld: 1E, 17G, 85A, 76C GRAI7817
4 Nov 77 38p
Rept No: FAA-NA-78-14
Monitor: FAA-RD-78-14

Abstract: The FAA is conducting operational demonstrations of several TRSB hardware configurations at selected airports in the United States and abroad. The first demonstration was at Cape May, NJ, using the Small Community System. The second demonstration was at Jorge Newbery Aeroparque in Buenos Aires, Argentina, using the Basic Narrow TRSB collocated with UHF/VHF ILS. This system was designed for azimuth proportional guidance +40 degrees about the runway centerline, elevation proportional guidance from 1 degree to 15 degrees, and coverage of at least 20 nautical miles in heavy rain. Most of the flights were in the NASA B-737 terminal configured vehicle which recorded TRSB angle data, together with ground tracking data from radio theodolite and optical television tracking equipment. Flight profiles included completely coupled, descending, curved paths to a close-in intercept (2.0 and 1.1 nautical miles) of runway centerline, followed by autoland and roll-out on runway. Results using the Basic Narrow System are: Can be collocated without adversely affecting ILS performance, The TRSB system required minimal site preparation and installation time; Signal guidance quality appeared to be excellent, Guidance signal quality within ICAO requirements for a 'full capability system' and requirements for FAA proposed 'TRSB Autoland'; The system demonstrated near total immunity to interference from propeller modulation; and With precision DME, the system can be used for noise abatement procedures, including segmented elevation angles and curved approaches. (Author)

Descriptors: *Microwave landing systems, Argentina, Noise reduction, Distance measuring equipment

Identifiers: TRSB(Time reference scanning beam), Basic narrow system, NTISDODXA, NTISDOTFAA

AD-A054 451/0ST NTIS Prices: PC A03/MF A01

TRSB Microwave Landing System Demonstration Program at Brussels, Belgium

National Aviation Facilities Experimental Center Atlantic City N J (240550)

Final rept.
E1692D3 Fld 1E, 17G, 85A, 76C GRAI7817
Feb 78 84p
Rept No FAA-NA-78-18
Monitor: FAA/RD-78-18

Abstract The demonstrations at Brussels, Belgium, were the sixth in a series of FAA conducted operational demonstrations of several TRSB system configurations at selected airports in the United States and abroad The Basic Wide aperture TRSB was installed to service Runway 07L which was the longest of three major runways at the airport. Operational demonstrations and data acquisition flights were made using FAA CV-880 and B-727 aircraft. One-third of the landings were autoland. Flight profiles included straight-in and curved approaches, radials, and partial orbits. Some flight tests were also made by British Civil Aviation Authority personnel using TRSB equipment installed in a CAA flight inspection aircraft. Results of thee operational demonstrations indicate that the performance of th TRSB Basic Wide system configuration meets the ICAO full capability system requirements.

Descriptors: *Microwave landing systems, All weather aviation, Demonstrations, Belgium, Configurations, Comparison

Identifiers: Time referenced scanning beams, NTISDODXA, NTISDOTFAA

AD-A054 298/5ST NTIS Prices: PC A05/MF A01

TRSB Microwave Landing System Demonstration Program at Toncontin International Airport Tegucigalpa, Honduras

National Aviation Facilities Experimental Center Atlantic City N J (240550)

Final rept.
E1695F4 Fld: 1E, 17G, 85A, 76C GRAI7817
26 Nov 77 43p
Rept No: FAA-NA-78-15
Monitor: FAA-RD-78-15

Abstract: The FAA is conducting operational demonstrations of several TRSB hardware configurations at selected airports in the United States and abroad. The first demonstration was at Cape May, New Jersey, using the Small Community System. The second demonstration was at Jorge Newbery Aeroparque in Buenos Aires, Argentina. The third demonstration, using the Small Community System at Toncontin Airport in Honduras, presented a geographical challenge to the operation of any precision landing system. Mountainous terrain and minimal NAV-AIDS and runway lights, limit scheduled airline flights to daylight hours. Terrain features necessitated offset approach paths for Runway 19, with azimuth and elevation sites collocated. This TRSB configuration provides azimuth proportional guidance + or - 10 deg about the runway centerline, with directional guidance from 10 deg out to 40 deg. Elevation proportional guidance from 2 deg to 11 deg, with fly-down clearance from 11 deg to 15 deg, is provided. Coverage distance is at least 20 nautical miles under heavy rain. Results using the TRSB System are: (1) The system required minimal site preparation and installation time; (2) demonstrations of several offset approach angles indicated TRSB guidance flexibility; (3) the TRSB system was judged subjectively as providing excellent guidance signals; (4) the TRSB 'Small Community System' was demonstrated to meet its design specifications; and (5) for this airport and runway, the data indicates that guidance signal quality, with no filtering, is well within ICAO noise requirements for a 'reduced capability system.'

Descriptors: *Microwave landing systems, Honduras

Identifiers: *TRSB(Time Reference Scanning Beam), Small community system, NTISDODXA, NTISDOTFAA

AD-A054 452/8ST NTIS Prices: PC A03/MF A01

TRSB Microwave Landing System Demonstration Program at John F. Kennedy International Airport, Long Island, New York, U.S.A

National Aviation Facilities Experimental Center Atlantic City N J (240550)

Final rept. 2 Dec 77-4 Jan 78.

E2034E1 Fld: 17B, 1F, 85A, 76D GRAI7820
4 Jan 78 135p
Rept No: FAA-NA-78-16
Monitor: FAA/RD-78/16

Abstract: The TRSB system demonstration at JFK in December 1977 was installed on Runway 13L and consisted of a 1 phased array azimuth subsystem, a 1.5 elevation subsystem with an antenna of the Rotman lens design, and a precision L-Band DME. A new laser tracker, previously untried in the field, was provided for precise aircraft position data, but due to calibration survey errors and data processing software problems, the tracker data was considered unusable. However, TRSB airborne recordings are available for several flights and provide a useful data output. During the operational demonstrations, national and international observers in the NASA B-737 aircraft flew the 'Canarsie approaches', under fully coupled and manual flight conditions to touchdown and rollout. These demonstrations highlighted the important capability of MLS to provide precision guidance over complex approach paths to a busy international airport.

Descriptors: *Microwave landing systems, Demonstrations, International airports, Site selection, Doppler systems, Scanning, Test facilities, Terminal flight facilities, Civil aviation, Phased arrays, Elevation, Azimuth, L band, Flight testing

Identifiers: B-737 aircraft, John F. Kennedy International Airport, NTISDODXA, NTISDOTFAA

AD-A055 447/7ST NTIS Prices: PC A07/MF A01

TRSB Microwave Landing System Demonstration Program at Kristiansand, Norway

National Aviation Facilities Experimental Center Atlantic City N J (240550)

Final rept.
E2031H3 Fld: 1B, 17G, 85A, 51B GRAI7820
Jan 78 83p
Rept No: FAA-NA-78-17
Monitor: FAA-RD-78-17

Abstract: The demonstration at Kjevik Airport, Kristiansand, Norway, was the fifth in a series of operational demonstrations of several TRSB system configurations at selected airports in the United States and abroad. Two TRSB system configurations, Basic Narrow Aperture and Small Community Systems, were installed to service the non-instrument Runway 22 which has a normal 4 deg approach glidepath. Approach to this runway is along a valley with surrounding terrain obstructions that subtend elevation angles to 2.8 deg within 20 deg of runway centerline. Operational demonstrations and data acquisition flights were made utilizing an FAA Boeing 727 test aircraft. Flight profiles included approaches, radials, and partial orbits perpendicular to the runway centerline. Some flight tests were also made by Norwegian and British Civil Aviation Authority personnel using TRSB equipment installed in their respective flight inspection aircraft. Results of the operational demonstrations indicated that the performance of both system configurations was well within their respective U.S. Phase III program design requirements and also met ICAO (AWOP) 'full capability system' requirements. (Author)

Descriptors: *Microwave landing systems, *Glide path systems, Test and evaluation, Electronic scanners, All weather aviation, Jet transport planes, Flight paths, Terrain avoidance, Experimental data, Norway

Identifiers: Kristiansand, Kjevik Airport, TRSB(Time Reference Scanning Beam), Time reference scanning beam, Boeing 727 aircraft, NTISDODXA, NTISDOTFAA

AD-A055 317/2ST NTIS Prices: PC A05/MF A01

TRSB Microwave Landing System Demonstration Program at Cape May, New Jersey, U. S. A

National Aviation Facilities Experimental Center Atlantic City N J (240550)

Final rept. 27 Sep-8 Oct 77.
E1703I1 Fld: 17G, 1E, 85A, 76D GRAI7817
8 Oct 77 32p
Rept No: FAA-NA-78-13
Monitor: FAA-RD-78-13

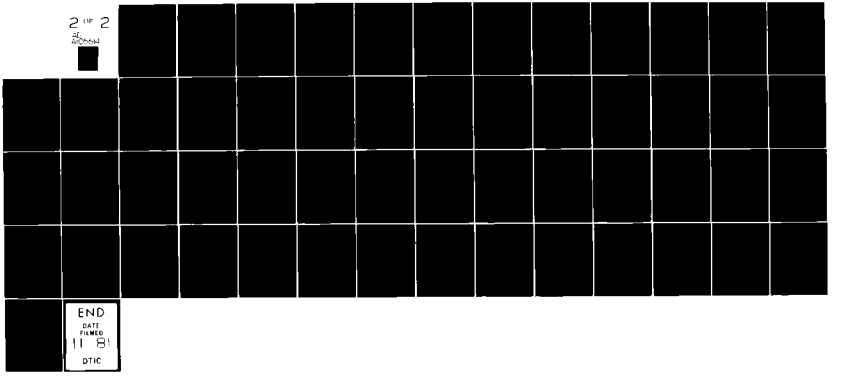
Abstract: The Small Community (SC) TRSB MLS built by the Bendix Corporation was demonstrated at the Cape May County Airport, September 27 to October 8, 1977. The SC system provides proportional guidance over an azimuth sector of + or - 10 degrees about the runway centerline with clearance signals out to + or - 40 degrees. Proprotional guidance is provided in elevation from 2 degrees to 11 degrees. Fly-down clearance is provided from 11 degrees to 15 degrees. System coverage is at least 20 nautical miles in heavy rain. Demonstration flights were conducted using a DC-6 and a 'Twin Otter'. Data were collected utilizing a radio theodolite. Results of these tests indicate: (1) The system required minimal site preparation and installation time; (2) The system was subjectively determined to have very good guidance characteristics; (3) The 'Small Community System' exceeds its design specifications; (4) For this airport and runway, guidance signal quality is well within ICAO requirements for a 'reduced capability system'; and (5) The 'Small Community' TRSB configuration path and course signal structure meets Category II ILS requirements. (Author)

Descriptors: *Microwave landing systems, Flight testing, Rain

Identifiers: *TRSB(Time Reference Scanning Beams), Small community systems, Cape May(New Jersey), DC-6 aircraft, Twin Otter aircraft, Radio theodolites, NTISDODXA, NTISDOTFAA

AD-A054 605/1ST NTIS Prices: P[illegible]03/MF A01

AD-A105 514 OHIO UNIV ATHENS DEPT OF ELECTRICAL ENGINEERING F/G 17/7
MLS PERFORMANCE ASSESSMENT. TASK IV. VOLUME 2. LITERATURE SEARC--ETC(U)
DEC 80 R W LILLEY DOT-FA79NA-6030
UNCLASSIFIED EER-47-3 FAA-CT-81-50-VOL-2 NL



TRSB Microwave Landing System Demonstration Program at Shiraz, Iran

National Aviation Facilities Experimental Center Atlantic City N J (240550)

Final rept.
E2035L4 Fld: 1B, 17G, 85A, 51B GRAI7820
Mar 78 45p
Rept No: FAA-NA-78-23
Monitor: FAA-RD-78-23

Abstract: The system was flown to Shiraz in an FAA Boeing 727 testbed aircraft and installed on Runway 29R. Data acquisition and operational demonstration flights were flown with the FAA B-727 aircraft over the period March 3-8, 1978. During the flights, a radio telemetry theodolite was used for aicraft space-position data. Flight profiles included straight-in approaches at various elevation angles, level runs at 2000 feet altitude on centerline, and + or - 10-degree offsets, + or - 5-degree offsets, and 5-nautical mile partial orbits at 1500-feet altitude. Results of the flight tests indicate that the performance of the TRSB Small Community System was within the design requirements.

Descriptors: *Microwave landing systems, Demonstrations, Iran, Performance(Engineering), Accuracy, Site selection, Installation

Identifiers: Boeing 727 aircraft, Time referene scanning beam, NTISDODXA, NTISDOTFAA

AD-A055 526/8ST NTIS Prices: PC A03/MF A01

TRSB Microwave Landing System Demonstration Program at Nairobi, Kenya

National Aviation Facilities Experimental Center Atlantic City N J (240550)

Final rept.
E1704G2 Fld: 17G, 1C, 85A, 76D GRAI7817
Feb 78 46p
Rept No: FAA-NA-78-22
Monitor: FAA-RD-78-22

Abstract: The operational demonstration at Embakasi International Airport serving Nairobi, Kenya, was the ninth in a series of TRSB worldwide demonstrations. Previous demonstrations of the TRSB 'Small Community System,' the most economical TRSB configuration, were held at five other sites in the United States, Central America, Europe, and West Africa. The system was flown to Nairobi in an FAA Boeing 727 testbed aircraft and installed on the same runway as a commissioned ILS. Data acquisition and operational demonstration flights were flown with the FAA B-727 aircraft over a period of 5 days (February 20-24, 1978). During the flights, a radio telemetry theodolite and an optical electronic tracker were used for aircraft space-position data. Flight profiles included straight-in approaches at various elevation angles, level runs at 1500-feet altitude on centerline, and + or - 10-degrees offsets, and 10-nautical mile partial orbits at 3500-feet altitude. Results of the flight tests indicate that the performance of the TRSB 'Small Community System' was within the U.S. Phase III Program design requirements, the ICAO 'reduced capability system' requirements, and the ICAO 'full capability system' requirements. The TRSB system installation did not adversely affect the ILS. (Author)

Descriptors: *Microwave landing systems, *All weather aviation, Airports, Kenya, Aircraft landings, Flight testing, Performance(Engineering), Passenger aircraft, Global

Identifiers: Time reference scanning beams, TRSB(Time Reference Scanning Beams), Small community systems, Nairobi(Kenya), NTISDODXA, NTISDOTFAA

AD-A054 646/5ST NTIS Prices: PC A03/MF A01

TRSB Microwave Landing System Demonstration Program at Charleroi, Belgium

National Aviation Facilities Experimental Center Atlantic City N J (240550)

Final rept.
E2054C1 Fld: 10, 18, 17G, 85A, 51B GRAI7820
Feb 78 53p
Rept No: FAA-NA-78-19
Monitor: FAA-RD-78-19

Abstract: The demonstration at Gosselies Airport, Charleroi, Belgium, was held in conjunction with the United States TRSB demonstration program, and was the sixth in a series of operational demonstrations of several TRSB system configurations at selected airports in the United States and abroad. The TRSB Small Community System was installed to service Runway 25, the runway with a commissioned Instrument Landing System. Flight checks established that no mutual interference resulted. Operational demonstrations were made utilizing FAA Boeing 727 and Convair 880 test aircraft. Flight performance data was acquired with the Boeing 727 test aircraft only. Flight profiles included approaches on centerline and offset plus and minus 1 and 2 degrees at various elevation angles, and radials at constant altitude on centerline and offset plus and minus 10 degrees. Results of the operational demonstrations indicated that performance of the TRSB Small Community azimuth subsystem met ICAO (AWOP) 'full capability system' requirements. Although an accurate assessment of the elevation subsystem performance was not possible due to lack of adequate tracking data, the elevation angle deviations about an averaged value were well within ICAO (AWOP) 'full capability system' error limit boundaries. (Author)

Descriptors: *Microwave landing systems, *Aviation safety, Instrument landings, Aircraft landings, Flight control systems, Performance(Engineering), Runways, Test equipment, Optical tracking, Belgium, Jet transport planes, Commercial aviation, Approach indicators

Identifiers: Boeing 727 aircraft, Convair 880 aircraft, NTISDODXA, NTISDOTFAA

AD-A055 920/3ST NTIS Prices: PC A04/MF A01

TRSB Microwave Landing System Demonstration Program at Dakar, Senegal

National Aviation Facilities Experimental Center Atlantic City N J (240550)

Final rept.

E1704G1 Fld: 17G, 1C, 85A, 76D GRAI7817
Feb 78 54p
Rept No: FAA-NA-78-21
Monitor: FAA-RD-78-21

Abstract: The demonstration at Yoff Airport, Dakar, Senegal, was the eighth in a series of operational demonstrations of several TRSB system configurations at selected airports in the United States and abroad. The TRSB Small Community System was installed on the same runway as a commissioned ILS. Flight checks established that no mutual interference resulted. Operational demonstrations and data acquisition flights were made utilizing an FAA Boeing 727 testbed aircraft. Flight profiles included approaches, radials, and partial orbits perpendicular to the runway centerline. Results of the operational demonstrations indicated that the performance of the TRSB Small Community System configuration was within the Phase III design requirements and met the ICAO 'full capability system' requirements. (Author)

Descriptors: *Microwave landing systems, *All weather aviation, Airports, Performance(Engineering), Systems engineering, Aircraft landings, Flight testing, Passenger aircraft, Global

Identifiers: Time reference scanning beams, TRSB(Time Reference Scanning Beams), Dakar(Senegal), Small community systems, Boeing 727 aircraft, Senegal, NTISDODXA, NTISDOTFAA

AD-A054 645/7ST NTIS Prices PC A04/MF A01

B. Engineering Index Files.

Print 6/5/1-140
DIALOG File8: COMPENDEX - 70-80/Dec (Copr. Engineering Index Inc.) (Item 1 of 140) User 3007 5jan81

1087489 ID NO.- EI801287489
SIMULATION INVESTIGATION ON THE FEASIBILITY OF CURVED APPROACHES UNDER MLS GUIDANCE.
Erkelens, L. J. J.
Natl Lucht Ruimtevaartlab Versl Verh n 78035 U 1978 100 p
CODEN: VVNLA2
The limitations of the instrument landing systems (ILS) are assessed. The advantages of the new approach system using microwaves (MLS) are evaluated with respect to reliability and precision in approach guidance. In the present simulator investigation the utility of seven laterally curved approaches with various turn angles and final intercept altitudes, executed with a B-747 aircraft, have been investigated. 7 refs.
DESCRIPTORS: (*AIRCRAFT, *Control).
CARD ALERT: 652, 651

1080091 ID NO.- EI801180091
EXPERIMENTAL DETERMINATION OF POSITION-ESTIMATE ACCURACY USING BACK-AZIMUTH SIGNALS FROM A MICROWAVE LANDING SYSTEM.
Knox, Charles E.
NASA, Langley Res Cent, Hampton, Va
NASA Tech Pap n 1574 Dec 1979 36 p CODEN: NTPADG
This paper presents the results of flight tests using the NASA Terminal Configured Vehicle Boeing 737 airplane to obtain position estimates with back-azimuth signals from a microwave landing system. The most accurate position estimates were obtained from a combination of back-azimuth and distance-measuring-equipment (DME) signals. Less accurate position estimates were obtained with back-azimuth signals alone; the least accurate position estimates were obtained with dual DME signals. 6 refs.
DESCRIPTORS: (*AIRCRAFT, *Landing), (MICROWAVE DEVICES, Applications), AIR NAVIGATION.
IDENTIFIERS: MICROWAVE LANDING SYSTEMS
CARD ALERT: 652 714, 715

1070026 ID NO.- EI800970026
DESIGN OF AN ELECTRONIC MODEL OF A MICROWAVE AIRCRAFT LANDING SYSTEM.
Nikitin, A. O.
Telecommun Radio Eng v 33-34 n 6 Jun 1979 p 83-85 CODEN: TCREAG
An electronic model of an actual radio system for improving the efficiency of microwave landing systems and a method of modeling their signals at the second IF of the onboard receiver are proposed. 5 refs.
DESCRIPTORS: (*RADIO SYSTEMS, *Computer Simulation), (AIRCRAFT, Landing).
IDENTIFIERS: ELECTRONIC MODEL
CARD ALERT: 716, 723, 652

1049445 ID NO.- EI800749445
AEROSPACE AND MILITARY.
Lombardo, Thomas G.
IEEE Spectrum v 17 n 1 Jan 1980 p 75-80 CODEN: IEESAM
ISSN 0018-9235
The most significant aviation-aerospace and military developments of 1979 are surveyed: the Microwave Landing System, which was begun by the Federal Aviation Administration; the Navstar Global Positioning System; Voyager and Pioneer space probes; Viking landers and the Very High Speed Integrated Circuit (VHSIC) program.
DESCRIPTORS: *AEROSPACE ENGINEERING, MILITARY ENGINEERING.
CARD ALERT: 655, 656, 404, 901

984259 ID NO.- EI791184259
GUIDANCE ACCURACY CONSIDERATIONS FOR THE MICROWAVE LANDING SYSTEM L-BAND PRECISION DME.
Kelly, R. J.; LaBerge, E. F. C.
Bendix Corp, Baltimore, Md
IEEE Proc Natl Aerosp Electron Conf NAECON '79, Dayton, Ohio, May 15-17 1979. Publ by IEEE (Cat n 79CH1449-8 NAECON), New York, NY, 1979 v 3 p 1130-1141 CODEN: NASEA9
The microwave landing system (MLS) developed by the FAA it to be a common civil-military system and provide a level of operations and equipments suitable for all classes of users. Integral to the MLS concept is the distance measuring equipment (DME) which measures range to touchdown. Requirements dictate aircraft range and range rate measurements with an accuracy at least an order of magnitude more precise than those needed for the conventional terminal DME application. Key to this precision DME (PDME) achieving its operational objectives is a complete accuracy specification and its rationale, including a measurement methodology. Not only must the error budget allocations between equipment instrumentation errors and multipath-induced errors be specified, but also the degree of airborne interrogator output data smoothing. These PDME filter time constants must be compatible with the flight control system characteristics of the aircraft to be served. This paper presents a consistent accuracy specification suitable for MLS operational requirements and A PDME implementation common for CTOL, STOL, and VTOL. 26 refs.
DESCRIPTORS: (*AIRCRAFT, *Landing), (AIRCRAFT INSTRUMENTS, Microwaves).
IDENTIFIERS: DISTANCE MEASURING EQUIPMENT, MICROWAVE LANDING SYSTEM
CARD ALERT: 652

984217 ID NO.- EI791184217
LES SYSTEMES DE MESURE DE DISTANCE TYPE $left double quote$ DME $right double quote$ ETAT ACTUEL ET DEVELOPPEMENTS FUTURS. $left bracket$ $left double quote$ DME $right double quote$ TYPE DISTANCE MEASURING SYSTEMS: PRESENT STATE AND FUTURE DEVELOPMENTS $right bracket$.
Schilliger, M.
Le Mater Teleph, Boulogne-Billancourt, Fr
AGARD Conf Proc n 251, Pap and Discuss presented at the Avionics Panel Symp, Monterey, Calif, Oct 18-21 1978. Publ by AGARD, Neuilly-sur-Seine, Fr, 1979. Available from NTIS, Springfield, Va p 33. 1-33. 8 CODEN: AGCPAV
ISSN 0549-7191
DME with VOR can be used for medium range navigation. Its use with ILS and microwave landing systems for accomplishing landing is also foreseen. After outlining DME's principles of operation, improvements which can be achieved through new technology are discussed. In French.
DESCRIPTORS: *AIR NAVIGATION, RADIO NAVIGATION.
IDENTIFIERS: DISTANCE MEASURING EQUIPMENT
CARD ALERT: 431, 716

971381 ID NO.- EI790971381
INTERIM STANDARD MICROWAVE LANDING SYSTEM.
Toman, D. J.
Tull Aviat Corp, Armonk, NY
Navigation v 25 n 3 Fall 1978 p 298-309 CODEN: NAVIB3
ISSN 0028-1522
Conceived as a bridge between the VHF/UHF ILS and the future international standard Microwave Landing System, ISMLS provides all the operational benefits of conventional ILS with few of the technical headaches. The ISMLS, its signal format, how it copes with difficult siting problems and how it manages to bridge the gap between the existing VHF/UHF system and the future worldwide system, serving the immediate needs of the aviation community is described.
DESCRIPTORS: (*MICROWAVES, *Applications), (AIRCRAFT, Landing).
CARD ALERT: 711, 652

958315 ID NO.- EI790858315
ADVANCED BRAKING CONTROLS FOR BUSINESS AIRCRAFT.
Longyear, D. M.; Hirzel, E. A.
Crane Co, Hydro-Aire Div
SAE Prepr n 790590 for Meet Apr 3-6 1979 14 p CODEN: SEPPA8

This paper discusses the phenomenon involved in stopping an aircraft and the capabilities required to meet microwave landing system operations. Today's major terminals are becoming saturated, primarily because of the increased commercial traffic, and to relieve the pressure, business aircraft are being relegated to outlying fields. In some airports, they are severely restricted or outlawed. The microwave landing system opens new vistas for the entire aviation industry because it greatly expands the access to the terminal and thereby offers additional landing windows for the business aircraft operators. However, to operate in the microwave landing system, the nonscheduled operator will be required to have avionics equipment similar to the larger commercial aircraft. Also, if he is to take full advantage of the landing facilities, he will require full automatic braking capability. 3 refs.

DESCRIPTORS: (*AIRCRAFT, *Brakes).
IDENTIFIERS: BUSINESS AIRCRAFT, MICROWAVE LANDING SYSTEM
CARD ALERT: 652, 602, 632

939673 ID NO.- EI790639673
LE CHOIX D'UN NOUVEAU SYSTEME D'ATTERRISSAGE INTERNATIONAL PAR L'OACI. $left bracket$ Choice of a New International Landing System by the ICAO $right bracket$.
Fombonne, M. P.
Thomson-CSF, Paris, Fr
Onde Electr v 58 n 11 Nov 1978 p 715-720 CODEN: ONELAS
ISSN 0030-2430

The international ILS (Instrument Landing System) which was standardized in 1947, is plagued with constitutional deficiencies that a more modern system might not present. Since 1969, various solutions proposed by several nations, among them France, have been compared and evaluated. This intense technical effort culminated in April 1978 when ICAO (International Civil Aviation Organisation) selected the time reference scanning beams system proposed by the United States and Australia as successor of ILS. This system, which operates at 5 GHz, indicates the aircraft azimuth and elevation inside a wide volume and should be less sensitive than ILS to site effects. In French.

DESCRIPTORS: (*AIRCRAFT, *Landing), (AIR NAVIGATION, Control Equipment).
CARD ALERT: 652, 715, 716, 431, 732

919630 ID NO.- EI790719630
RADAR TECHNOLOGY FOR THE 1980S
Barton, David K
Raytheon Co, Bedford, Mass
Microwave J v 21 n 11 Nov 1978 p 81-86 CODEN: MCWJAD

Developments in digital signal processing have made possible a great increase in clutter rejection and target detection capabilities of conventional scanning radars. Along with improved antennas, using array techniques for sidelobe control and generation of stacked beams, this technology will maintain the mechanically rotating radar, in 2D and 3D forms, for another decade as the primary source of air surveillance data. Electronically scanned arrays have finally reached production status, and will find increasing use where multiple-target tracking and multifunction operation from a single vehicle is needed, as well as in a few large space surveillance installations. Limited sector phased arrays can be expected to reach substantial production for such applications as hostile weapon location and landing systems (radar GCA and nonradar microwave landing systems to replace present ILS). 16 refs.

DESCRIPTORS: *RADAR.
CARD ALERT: 716

914074 ID NO.- EI790314074

SIMULATION AUTOMATISCHER LANDEANFLUEGE FUER VERKEHRSFLUGZEUGE AM BEISPIEL EINER BOEING 707. $left bracket$ Simulation of Automatical Landing Approaches for Passenger Planes at the Example of a BOEING 707 $right bracket$.

Oehn, Chr.

Tech Univ Braunschweig, Ger

Regelungstechnik v 26 n 8 Aug 1978 p 251-258 CODEN: RLSTA5

New procedures for the improvement of air traffic in the close-range of airports are investigated in the special research section $left double quote$ Guidance $right double quote$ (SFB 58), promoted by the $left double quote$ Deutsche Forschungsgemeinschaft $right double quote$. Thereby mainly questions of safety and of better capacity utilization with reduced environmental impact are considered. The problems can be solved only applying new microwave landing systems and by better cooperation of the pilot with the flight controller. By means of computer simulations, the limit case of the completely automatic approach, according to noise reducing and capacity augmenting steep landing procedures are investigated. The results are to be used as a reference basis for manually controlled approaches. 12 refs. In German.

DESCRIPTORS: (*AIRCRAFT, TRANSPORT, *Landing), COMPUTER SIMULATION.

IDENTIFIERS: PASSENGER PLANES

CARD ALERT: 723, 652, 731

914033 ID NO.- EI790314033

907018 ID NO.- EI790207018

LANDING AIRCRAFT UNDER POOR CONDITIONS.

Kelly, Robert J ; Redlien, Henry W ; Shagena, Jack L.

Bendix Corp, Towson, Md

IEEE Spectrum v 15 n 9 Sep 1978 p 52-57 CODEN: IEESAM

The time reference scanning-beam microwave landing system (TRSB MLS) is a system approach to the landing guidance problem $EM DASH$ it can meet a wide variety of diverse performance, economic, and safety requirements and still supply a universal airborne receiver-processor able to operate with all ground systems. The TRSB is an $left double quote$ air derived $right double quote$ system operating in the C-band. Ground-based equipment supplies signals to a receiver in the landing aircraft to determine position information: two angle coordinates and a range coordinate. The angle information is derived by measuring the time difference between the successive passes of highly directive, narrow fan beams. One beam scans in azimuth and one in elevation. The range information is derived from equipment similar to conventional L-band distance-measuring equipment (DME) modified for additional precision.

DESCRIPTORS: (*AIRCRAFT, *Landing), (AVIONICS, Microwaves), (AIR TRANSPORTATION, Traffic Control).

IDENTIFIERS: AIRCRAFT LANDING SYSTEMS

CARD ALERT: 652, 715, 431

900210 ID NO.- EI790100210
STEEP GRADIENT APPROACH SYSTEMS RESEARCH FOR ALL-WEATHER OPERATIONS.
Brown, A. D.
R Aircraft Establ, Bedfordshire, Engl
AGARD Conf Proc n 240. Pap Presented at the Guid and Control Panel Symp, Dayton, Ohio, Oct 17-20 1977 Publ by AGARD, Neuilly-sur-Seine, Fr, Apr 1978. Available from NTIS, Springfield, Va p 15. 1-15 15 CODEN: AGCPAV
This paper describes some aspects of steep gradient approach research carried out at RAE Bedford between 1973 and 1975 using flight trials, piloted simulation and theoretical studies. Because only conventional aircraft were available, the flight program was oriented toward establishing the limitations of such types and their associated avionics equipment when used for R/STOL operations. Only performance data for the twin turbojet BAC 1-11 and the twin turboprop HS 748 are presented in the paper. Aspects considered include the determination of the maximum usable glideslope angle and the optimum beamwidths for azimuth and elevation radio guidance to permit R/STOL operations using a standard autopilot. It is suggested that MLS (Microwave Landing System) with DME (Distance Measuring Equipment) range information will overcome some of the limitations identified. Manual approach performance results are also presented which indicate the need for 150-200 ft decision heights. Piloted simulation research has shown a requirement for approach lighting comparable to existing Category 2 patterns for poor visibility operations. Even then, it is unlikely that acceptable missed approach rates can be achieved unless RVRs are in excess of 1000 meters. 15 refs.
DESCRIPTORS: (*AIRCRAFT, VTOL/STOL, *Landing), AVIONICS.
CARD ALERT: 652, 715

900208 ID NO.- EI790100208
PROPAGATION INTEGRITY FOR MICROWAVE INSTRUMENT LANDING SYSTEMS.
Demko, Paul S.
US Army Avionics Res & Dev Act
AGARD Conf Proc n 240. Pap Presented at the Guid and Control Panel Symp, Dayton, Ohio, Oct 17-20 1977. Publ by AGARD, Neuilly-sur-Seine, Fr, Apr 1978. Available from NTIS, Springfield, Va p 21. 1-21. 8 CODEN: AGCPAV
Testing at airfields at microwave landing system frequencies, using typical realistic multipath geometries and prototypical microwave landing system antenna radiation patterns, has indicated the existence of a multipath problem that must be reckoned with if the next generation microwave landing system, whatever it may be, is to provide the utmost in operational utility and safety. There is strong evidence to support a contention that the choice of the correct polarization is fundamentally the surest way to relieve the next generation precision approach and landing systems from the burden of unnecessary multipath signals. The data weigh heavily in favor of circular polarization. 13 refs.
DESCRIPTORS (*AIRCRAFT, MILITARY, *Landing), (AIR NAVIGATION, Control Systems), AVIONICS.
CARD ALERT: 404, 652, 431, 731, 715

900187 ID NO.- EI790100187
DME-BASED SYSTEM FOR ENROUTE/TERMINAL NAVIGATION, ALL-WEATHER LANDING AND AIR TRAFFIC CONTROL.
Eckert, K. D.
Standard Elektr Lorenz, Stuttgart, Ger
AGARD Conf Proc n 240. Pap Presented at the Guid and Control Panel Symp, Dayton, Ohio, Oct 17-20 1977 Publ by AGARD, Neuilly-sur-Seine, Fr, Apr 1978. Available from NTIS, Springfield, Va p 22. 1-22. 13 CODEN: AGCPAV
Three significant extensions of the standard DME system are discussed, namely, the Precision DME (an integrated navigation system including a microwave landing system), the application of direction finding principles using the DME signal format, and the integration of ground-to-air data transfer into the DME system. Examples of operational applications of the combination of precision distance measurement and ground derived direction finding in the field of radio navigation and air traffic control are cited.
DESCRIPTORS (*AIRCRAFT, *Landing), (AIR TRANSPORTATION, Traffic Control), AIR NAVIGATION, AVIONICS.
CARD ALERT: 652, 431, 715

900185 ID NO.- EI790100185
AUTOMATIC FLIGHT PERFORMANCE OF A TRANSPORT AIRPLANE ON COMPLEX MICROWAVE LANDING SYSTEM PATHS.
Walsh, Thomas M.; Weener, Earl F.
NASA, Langley Res Cent, Hampton, Va
AGARD Conf Proc n 240, Pap Presented at the Guid and Control Panel Symp, Dayton, Ohio, Oct 17-20 1977. Publ by AGARD, Neuilly-sur-Seine, Fr, Apr 1978. Available from NTIS, Springfield, Va p 19. 1-19. 12 CODEN: AGCPAV
In May 1976, the National Aeronautics and Space Administration, through its Langley Research Center Terminal Configured Vehicle (TCV) Program, participated with the Federal Aviation Administration (FAA) in a demonstration of the U. S. A. microwave landing system. During this demonstration the microwave landing system was utilized to provide the TCV B-737 airplane with guidance for automatic control on complex, curved descending paths with precision turns into short final approaches terminating in landing and roll-out, even when subjected to strong and gusty tail- and cross-wind components and severed wind shear. The data collected from more than fifty approach flights during the demonstration provided an opportunity to analyze airplane flight performance on a statistical basis rather than on a single flight record basis as is customarily done with limited data replication. Mean and standard deviation data are presented for approach flight path tracking parameters. In addition, the adverse wind conditions encountered during these flights are described using three-dimensional wind vector characteristics computed from the extensive on-board sensor data. 4 refs.
DESCRIPTORS: (*AIRCRAFT, *Landing), (AIR NAVIGATION, Control Systems).
CARD ALERT: 652, 431, 731

900175 ID NO.- EI790100175
GUIDANCE AND CONTROL DESIGN CONSIDERATIONS FOR LOW-ALTITUDE AND TERMINAL-AREA FLIGHT, 1977.
Anon
AGARD, Guid and Control Panel, Neuilly-sur-Seine, Fr
AGARD Conf Proc n 240, Pap Presented at the Guid and Control Panel Symp, Dayton, Ohio, Oct 17-20 1977. Publ by AGARD, Neuilly-sur-Seine, Fr, Apr 1978. Available from NTIS, Springfield, Va var pagings CODEN: AGCPAV
This conference proceedings contains 24 papers on the modes of guidance and control of aircraft subject to special environmental conditions near the ground. Of these papers 21 are indexed separately. Topics discussed include open-loop compensation of wind-shear effects in low level flight, a flight control system for achieving ride smoothing under low-altitude high-speed flight conditions, human engineering evaluation of a cockpit display/input device, a radar navigation system for low-altitude and terminal-area flight, a ground avoidance monitor for fighter aircraft, system integration and safety monitoring in low-altitude flight control systems, testing and evaluation of the B-1 terrain-following system, steep gradient approach research for R/STOL operations, electronic display devices for approach to landing digital flight control design for VTOL approach and landing, automatic control of a transport aircraft on complex Microwave Landing System paths, the reduction of multipath effects in MLS design, the growth potential of the Distance Measuring System, the position errors of an advanced 4-D area navigation system, and the use of direct lift control for flight path maintenance and gust alleviation.
DESCRIPTORS: (*AIRCRAFT, *Control), AIR NAVIGATION, AVIONICS.
CARD ALERT: 652, 431, 715

900169 ID NO.- EI790100169
GET ACQUAINTED WITH SCANNING-BEAM MLS.
Nelson, James R.
Fed Aviat Adm, Washington, DC
Microwaves v 17 n 6 Jun 1978 p 68-69, 72, 74-77 CODEN: MCRWAR
The operation and requirements of the time-reference, scanning-beam (TRSB) microwave landing system recently endorsed by the International Civil Aviation Organization (ICAO) are reviewed. MLS, as endorsed by ICAO, operates at C-band which permits ranges of up to 30 nmi to be reliably achieved with modest transmitting powers, even under adverse conditions of heavy rainfall. These frequencies will also permit the use of much smaller antennas compared to the UHF/VHF frequencies used by ILS. When combined with a proper signal format, current technology in solid-state digital circuitry, and modern antenna design, a C-band system can be produced that is simple yet capable of providing many new landing functions for aircraft.
DESCRIPTORS: (*AIR TRANSPORTATION, *Traffic Control), (AIRCRAFT, Landing).
IDENTIFIERS: AIRCRAFT LANDING SYSTEMS
CARD ALERT: 431, 652

887823 ID NO - EI781287823
COMPARISON STUDY OF MLS AIRBORNE SIGNAL PROCESSING TECHNIQUES.
Kelly, R. J.; LaBerge, E. F. C.
Bendix Corp, Baltimore, Md
IEEE Proc Natl Aerosp Electron Conf NAECON '78, Dayton, Ohio, May 16-18 1978. Publ by IEEE (Cat n 78CH1336 7), New York, NY, 1978 v 2 p 502-510 CODEN: NASEA9
Early in the prototype hardware phase of the U. S program for TRSB, the Dwell Gate Processor which operates on the received beam envelope was selected because of its simplicity. This technique permitted significant reductions in the size, complexity and production cost of the avoinics through the use of a readily available, low-cost microprocessor (e. g. , the Intel 8080). The study discussed in this paper was undertaken to review this decision in the light of work that has been done on other processor mechanizations in the interim. The comparison study was based on both computer and receiver bench tests. The test results compared favorably with the theoretical predictions. It was concluded that the Dwell Gate Processor is the appropriate choice for general TRSB processing requirements. 9 refs.
DESCRIPTORS: *AVIONICS, SIGNAL PROCESSING, AIR NAVIGATION, (AIRCRAFT, Landing).
CARD ALERT: 652, 715, 716, 431

887432 ID NO.- EI781287432
MICROWAVE LANDING SYSTEMS. (CITATIONS FROM THE ENGINEERING INDEX DATA BASE).
Reed, William E. (Ed.)
NTIS, Springfield, Va
NTISearch NTIS/PS-77/0618/7EES, Search Period Covered 1970-Jul 1977. Publ by NTIS, Springfield, Va, Jul 1977. Available from Eng Index, New York, NY, or NTIS 80 p CODEN: NTISDZ
The bibliography cites papers from worldwide literature on the planning, development, and operation of microwave landing systems including feasibility, systems engineering, equipment, signal propagation, and cost analysis. This updated bibliography was prepared by searching the 1970-July 1977 data base of Engineering Index. It contains 80 abstracts, 11 of which are new entries to the previous edition.
DESCRIPTORS: (*AIRCRAFT, *Landing), (MICROWAVES, Applications), (ELECTRONIC EQUIPMENT, Applications), SYSTEMS ENGINEERING.
IDENTIFIERS: MICROWAVE LANDING SYSTEMS, BIBLIOGRAPHIES
CARD ALERT: 652, 711, 715, 912

887431 ID NO.- EI781287431
MICROWAVE LANDING SYSTEMS. (CITATIONS FROM THE NTIS DATA BASE).
Reed, William E. (Ed.)
NTIS, Springfield, Va
NTISearch NTIS/PS-77/0617/9ENS, Search Period Covered 1964 Jul 1977. Publ by NTIS, Springfield, Va, Jul 1977. Available from Eng Index, New York, NY, or NTIS 122 p CODEN: NTISDZ
Federally-sponsored research on the planning, development, and operation of aircraft microwave landing systems is presented. Studies include feasibility, systems engineering, equipment, signal propagation, and cost analysis. This updated bibliography was prepared by searching the 1964-July 1977 data base of NTIS. It contains 122 abstracts, 25 of which are new entries to the previous edition.
DESCRIPTORS: (*AIRCRAFT, *Landing), (MICROWAVES, Applications), (ELECTRONIC EQUIPMENT, Applications), SYSTEMS ENGINEERING.
IDENTIFIERS: MICROWAVE LANDING SYSTEMS, BIBLIOGRAPHIES
CARD ALERT: 655, 711, 715, 912

887430 ID NO.- EI781287430
USE OF THE U. S. INTERIM STANDARD MICROWAVE LANDING SYSTEM IN CANADA.
Reed, W. C.
Tull Int Corp
Can Aeronaut Space J v 24 n 4 Jul-Aug 1978 p 217-227 CODEN: CSPJAE
A description is given of the nterim Microwave Instrument Landing System selected by the U. S. Federal Aviation Administration until such time as the International Civil Aviation Organization develops and approves the Standards and Recommended Practices for the system finally chosen. This sytem, manufactured by Tull Aviation Corporation, is essentially a microwave version of ILS. The system operates at 5000 to 5250 MHz and uses a scanning beam technique to provide ease of installation and siting. However, the system uses the ILS signal format of 90 and 150 Hz in order to provide compatibility with aircraft ILS/VOR receivers. Users need only add an antenna, a frequency converter unit, and a small mod kit inside their ILS receiver, in order to receive the MILS signals. Operation is essentially identical to ILS, so that retraining of flight personnel is not required. The use of this system to provide precision approaches for helicopters shuttling workers between the Edson and Coal Valley heliports in Alberta in support of the Luscar Ltd. mining operation is reviewed.
DESCRIPTORS: (*AIRCRAFT, *Landing), RADIO TRANSMISSION, MICROWAVES.
CARD ALERT: 652, 716, 711

879497 ID NO.- EI781179497
MICROWAVE LANDING SYSTEMS.
Pogust, Frederick
Airborne Instrum Lab, Cutler-Hammer
IEEE Spectrum v 15 n 3 Mar 1978 p 30-36 CODEN: IEESAM
As microwave landing system technology enters its third decade, competing approaches contend for standardization at the international level. MLSs have long been considered the preferred alternative for the two landing guidance techniques developed during World War II and now in use $EM DASH$ the instrument landing system and the ground-controlled approach. This article examines the critical issues involved.
DESCRIPTORS: (*AIRCRAFT, *Landing), (AVIONICS, Microwaves).
CARD ALERT: 652, 715

879496 ID NO.- EI781179496
SCANNING-BEAM MICROWAVE LANDING SYSTEM INCORPORATING DOPPLER CODING.
Glasgow, J. A.
GEC-Marconi Electron Ltd, Res Lab, Engl
GEC J Sci Technol v 44 n 2 1978 p 87-92 CODEN: GJSTA6
A new landing guidance system for aircraft is required to replace the present-day Instrument Landing System, which provides guidance for only a single line of approach to the runway. With the new microwave landing system (MLS) the approach path can be suited both to particular aircraft and to the current traffic. A number of alternative techniques have been proposed, the two main contenders being the time-referenced scanning beam (TRSB) and the Doppler system. This paper describes a technique for forming a TRSB system that has exceptional precision with regard to position and time, while an accurate frequency coding may be applied to it as a modulation, so that it may be interpreted by a form of Doppler processor. 4 refs
DESCRIPTORS: (*AIRCRAFT, *Landing).
IDENTIFIERS: MICROWAVE LANDING SYSTEM
CARD ALERT: 652, 716

879484 ID NO.- EI781179484
RADIO LANDING SYSTEMS.
Darrington, P. R.
Wireless World v 84 n 1508 Apr 1978 p 38-43, 56 CODEN: WIWOAA
The background to radio blind landing aids are reviewed with reference to the decision of the International Civil Aviation Organization to adopt a microwave landing system for international use. The several competitors are described.
DESCRIPTORS: (*AIR TRANSPORTATION, *Traffic Control), (AIRCRAFT, Landing).
CARD ALERT: 431, 652

871194 ID NO.- EI781071194
SYSTEM REQUIREMENTS FOR TRANSITION FROM ENROUTE TO APPROACH GUIDANCE.
Meyer, D. H.
Rockwell Int, Cedar Rapids, Iowa
Navigation v 24 n 4 Winter 1977-1978 p 312-328 CODEN: NAVIB3
The airborne system operational/functional requirements (from navigation using enroute aids to navigation using approach guidance) are examined for the transitional phase of an aircraft flight. The automated navigation system (based nominally on enroute aids) and the ILS/MLS system capabilities are described, and the complementary nature of each is treated. To achieve the full potential benefits of proposed landing system operations, it is suggested that on-board enroute navigation systems will be an important aid to exploit fully the resulting operational capabilities. Proposed microwave landing system capabilities suggest new operational procedures for predefined maneuvers in the terminal area such as close-in captures and complex approach paths. These operational procedures, although only partially available at this time, can be expanded upon based on the operational advantages of the system. Equipment configurations are presented to demonstrate the system requirements. 6 refs
DESCRIPTORS: *AIR NAVIGATION, RADIO NAVIGATION.
CARD ALERT: 431, 716

862886 ID NO.- EI780962886
SPIRAL APPROACH NAVIGATION CONCEPTS FOR VTOL AIRCRAFT USING A MICROWAVE LANDING SYSTEM.
McGee, Leonard A.
NASA, Ames Res Cent, Moffet Field, Calif
Collect of Tech Pap, AIAA/NASA Ames V/STOL Conf, Palo Alto, Calif, Jun 6-8 1977 Publ by AIAA, New York, NY, 1977 p 248-256
Spiral approaches adjacent to the active runways of CTOL airports have been proposed as a means of effectively interfacing CTOL and VTOL landing operations. Assuming an airport equipped with a Microwave Landing System (MLS), a VTOL aircraft following a spiral approach path might, depending on the specific trajectory, pass alternately in and out of the linear coverage of the MLS and thereby suffer degraded navigation performance. The objective of this study was to employ essentially state-of-the-art aided inertial navigation concepts to explore the expected navigation performance operating in the environment just described. Results show that aided inertial concepts utilizing simple body-mounted inertial systems may be adequate for an instrument landing if the MLS azimuth and Distance Measuring Equipment (DME) signal coverages extend to within a few feet of the ground. 3 refs.
DESCRIPTORS: (*AIRCRAFT, VTOL/STOL, *Landing), (AIR NAVIGATION, Inertial Systems).
CARD ALERT: 652, 431

859129 ID NO.- EI780859129
PRECISION DME FOR NEW LANDING SYSTEM: FAST OR SLOW PULSE?
Graziani, Danio
FACE-Stand, Milan, Italy
Electr Commun v 52 n 4 1977 p 289-292 CODEN: ELCMAX
Recent proposals for the new precision distance measuring equipment to be collocated with the proposed microwave landing system are based on two main techniques: the fast and slow pulse. This paper analyzes the factors involved in using both these techniques and compares the anticipated costs. Comparison shows that the fast pulse method will probably have technical and economic advantages over the slow pulse technique. 6 refs.
DESCRIPTORS: (*MECHANICAL VARIABLES MEASUREMENT, *Distance), AIRCRAFT LANDING GEAR, MICROWAVES.
IDENTIFIERS: MICROWAVE LANDING SYSTEMS
CARD ALERT: 943, 652, 711

855082 ID NO.- EI780855082
SIMULATION DER VERKEHRSBELASTUNG BEI ANFLUG- UND LANDESYSTEMEN MIT STATISTISCHER ABFRAGE. $left bracket$ Simulation of Traffic Load for Approach and Landing Systems with Statistical Interrogations $right bracket$.
Skupin, Wolfgang; Ullrich, Rainer
Tech Univ Braunschweig, Ger
Frequenz v 31 n 8 Aug 1977 p 246-253 CODEN: FQNZA3
When an approach and landing system with statistical interrogations is measured, the entire air traffic that influences system reply efficiency and accuracy has to be considered. This traffic load is simulated by statistical generators. In this article the development of suitable simulation equipment based on a traffic model is described. The suitability of the equipment is demonstrated by means of some measuring results gained from test measurements with the microwave landing system DLS developed in West Germany. 4 refs. In German.
DESCRIPTORS: (*AIR TRANSPORTATION, *Traffic Control), (AIRCRAFT, Landing).
CARD ALERT: 431, 652

847364 ID NO.- EI780847364
MICROWAVE LANDING SYSTEM (MLS) IMPLEMENTATION, VOLUME 1 AND 2, 1977
Anon
RTCA (Radio Tech Comm for Aeronaut), Washington, DC
Microwave Landing Syst (MLS) Implementation, Publ by RTCA (Radio Tech Comm for Aeronaut) (Doc n DO 166), Washington, DC, 1977 2 vol, var pagings
This two-volume book is designed to show the benefits and operational capabilities of a microwave landing system (MLS) and, in addition, proposes short-, middle-, and long-term strategies for implementing the transition from the currently used VHF/UHF instrument landing system (ILS) to a standard nationwide MLS. Separate appendices present the reports of informal working groups of Special Committee 125 of the Radio Technical Commission for Aeronautics (RTCA) regarding MLS benefits, short-term implementation strategy rationale, and airborne systems operational capabilities.
DESCRIPTORS: (*AIRCRAFT, *Landing), (AIR TRANSPORTATION, Traffic Control).
CARD ALERT: 652, 431

847363 ID NO.- E1780747363
DOPPLER MLS. THE UK SOLUTION.
Ford, Terence
Aircr Eng v 50 n 2 Feb 1978 p 4-7 CODEN: AIENAF
In the Doppler MLS, a source of radiation is moved at a constant velocity along the ground and compared with a stationary frequency in an airborne receiver. The frequency difference represents a direct measure of the angle of the receiver from the array boresight. A practical and economic Doppler MLS system is obtained by commutating a radiating source along a short array of closely spaced elements in a repetitive manner. The Doppler MLS is a frequency-measurement system and is not sensitive to amplitude effects, and hence, the interference to ILS normally caused by other aircraft movements on and over the airfield is not seen in the new system. As it is structurally small, the Doppler MLS does not cause interference to ILS. For this reason, it is possible for both ILS and Doppler MLS to co-exist on the same runway, with each serving appropriately equipped aircraft during the transitional period.
DESCRIPTORS: (*AIRCRAFT, *Landing), (AIR TRANSPORTATION, Traffic Control), (ANTENNAS, Arrays).
CARD ALERT: 652, 431, 716

830822 ID NO.- E1780530822
AIRBORNE NAVIGATION SYSTEM PERFORMANCE DURING RNAV/MLS TRANSITION.
Heine, Walter
Syst Control, Inc. (Vt), Palo Alto, Calif
IEEE Proc Natl Aerosp Electron Conf NAECON '77, Dayton, Ohio, May 17-19 1977. Publ by IEEE (77CH1203-9 NAECON), New York, NY, 1977 p 705-712 CODEN: NASEA9
Aircraft position error sensitivity to sensor errors and flight path geometry is analyzed during RNAV/MLS transition using a digital computer simulation. The avionics sensitivity data provides information necessary to establish requirements for additional guidance law design and to establish airspace requirements for maneuvering to null out any residual RNAV errors upon MLS transition. The data base is also beneficial as planning information for subsequent flight testing. The parameters varied during the generation of the data base include flight profile, error source content and magnitude, ground facility location, runway/flight path orientation and navigation mode. The avionics, autopilots and aircraft dynamics correspond to the existing NASA Terminal Configured Vehicle. 10 refs.
DESCRIPTORS *AIR NAVIGATION.
CARD ALERT 431

787254 ID NO.- EI771287254
SCANNING-BEAM MICROWAVE LANDING SYSTEM $EM DASH$ MULTIPATH-ERRORS AND ANTENNA-DESIGN PHILOSOPHY.
Lopez, Alfred
Hazeltine Corp, Greenlawn, NY
IEEE Trans Antennas Propag v AP 25 n 3 1977 p 290-296
CODEN: IETPAK
Multipath reception can cause guidance-angle errors in a microwave landing system (MLS). The antenna radiation-control problem for a scanning-beam MLS is defined and analyzed. $left double quote$ Centerline emphasis $right double quote$ is presented as a helpful design philosophy for the ground antennas. It is shown that the maximum guidance-angle error is proportional to 1) the amplitude of the indirect signal, 2) the antenna beamwidth, and 3) the time derivative of the indirect signal as the direct beam peak scans by the receiver. This result is used in developing a rationale for the selection of the antenna beamwidth and sidelobe level (aperture size and excitation) for the azimuth and elevation guidance functions. 7 refs.
DESCRIPTORS: *AIRCRAFT INSTRUMENTS, (ANTENNAS, Design).
CARD ALERT: 652, 716

786531 ID NO.- EI771186531
TRANSPORTATION: SOME GOOD NEWS.
Friedlander, Gordon D.
IEEE Spectrum v 14 n 1 Jan 1977 p 70-73 CODEN: IEESAM
Developments during 1976 in transportation are reviewed. The discussion includes the performance evaluation by Amtrak of an advanced thyristor-controlled all-electric Swedish-built ASEA Rc4a locomotive, the testing of an SNCF (French National Railways) CC 21000 class six-axle locomotive by Amtrak, and the United States' debut of French-designed $left double quote$ RTG $right double quote$ -class turbotrains. An automated marshaling yard is described. A new generation of U. S. -built hydrofoil vessels went into service in ferrying passengers across the rough ocean channels that separate the principal islands of the Hawaiian chain. Highlights in the areas of military, air carrier, and general aviation included progress in the automation of the National Airspace Program and in the enhancement of the Automated Radar Terminal System, and completion of Microwave Landing System Phase II development.
DESCRIPTORS: (*TRANSPORTATION, *Reviews), (RAILROADS, Reviews), (AVIATION, Reviews), HYDROFOILS, LOCOMOTIVES, ELECTRIC, RAILROAD YARDS AND TERMINALS.
CARD ALERT: 431, 581, 433, 434, 682, 674

783466 ID NO.- EI771183466
RADARS SEE BETTER: VIKINGS SOAR, ROOST, TEST, AND TELL.
Torrero, Edward A.
IEEE Spectrum v 14 n 1 Jan 1977 p 74-78 CODEN: IEESAM
Developments during 1976 are reviewed. Technical advances on a broad front marked a year already highlighted by the successful landing of two Viking spacecraft on Mars. Radar technology, especially, made giant strides forward in 1976. For example, the application of the latest components and circuit techniques made possible radars that are virtually immune to false return signals due to ground and rain echoes. They can now track targets maneuvering in ways that used to $left double quote$ blind $right double quote$ earlier versions. The microwave landing system sponsored by the U. S. for international civil aviation passed tests conducted by the Federal Aviation Administration. The microwave landing system sponsored by the U. S. for international civil aviation passed tests conducted by the Federal Aviation Administration. The Army successfully tested its artillery and mortar-locating systems. In another breakthrough, the Army demonstrated the accuracy of guided projectiles fired from a cannon. The Navy moved ahead with plans to build two key data processors. Proteus, an acoustic signal processor for submarine detection, and the AN/AYK-14, a minicomputer that will become the branch's airborne standard.
DESCRIPTORS: (*MILITARY ENGINEERING, *Reviews), (AEROSPACE ENGINEERING, Reviews), RADAR, (AIRCRAFT, Landing), (DATA PROCESSING, Military Purposes).
IDENTIFIERS: MICROWAVE LANDING SYSTEM
CARD ALERT: 404, 901, 652, 716, 723

754379 ID NO.- EI770854379

ANTENNA RADIATION MODELING FOR MICROWAVE LANDING SYSTEM.

Balanis, Constantine A.; Cheng, Yuk-Bun

WV Univ, Morgantown

IEEE Trans Antennas Propag v AP-24 n 4 Jul 1976 p 490-497

CODEN: IETPAK

Geometric optics and diffraction techniques are used to develop radiation models of antennas mounted on an aircraft structure. Measurements at 35 GHz on a 1/35 scale model space shuttle and 1/11 scale Boeing 737 are used for comparison with computed patterns and are in very good agreement. Radiation coverage in the elevation plane on full scale Boeing 737 and Boeing 747 at 5.1 GHz, as applied to the microwave landing system (MLS), is examined for vertically- and horizontally-polarized antennas mounted at different locations on the aircraft. 15 refs.

DESCRIPTORS (*ANTENNAS, *Radiation), (AIRCRAFT, Landing), MICROWAVES.

IDENTIFIERS: MICROWAVE LANDING SYSTEM (MLS)

CARD ALERT 716, 652, 711

745709 ID NO.- EI770745709
COMMUTATED DOPPLER MICROWAVE LANDING SYSTEM FOR AIRCRAFT $EM DASH$ 3.
Barratt, R. S.; Lawson, R. K.
Plessey Radar Res Cent, Havant, Engl
Syst Technol n 25 Dec 1976 p 32-40 CODEN: SYTEAX
The first two parts of this series of articles on the Microwave Landing System (MLS) which will eventually replace the Instrument Landing System (ILS) appeared in earlier issues (part 1 by Ron S. Barrat published in Syst Technol n 21 Jun 1974 p 15-21; part 2 published by R. S. Barrat and J. M. Chambers in Syst Technol n 23 Mar 1976 p 21-28) These articles gave the background to MLS and a description of the ground subsystem. The present article summarizes the two earlier articles and goes on to describe in detail the airborne subsystem and some of the trials results. 2 refs
DESCRIPTORS: (*AIRCRAFT, *Landing), (ELECTRONIC EQUIPMENT, Microwaves),
CARD ALERT: 652, 715

745708 ID NO.- EI770745708
DESIGN CONSIDERATIONS FOR A FLARE GUIDANCE SUBSYSTEM.
Hodgkins, P. D.; Cafarelli, N. J.
Fed Aviat Adm, Washington, DC
Navigation v 23 n 3 Fall 1976 p 249-256 CODEN: NAVIB3
Describes the design considerations associated with the development of a file guidance subsystem for the time reference scanning beam (TRSB) microwave landing system (MLS). The two basic concepts for providing MLS flare guidance information are examined; the touchdown zone and wind model are defined; technologies and equipment that are candidates for providing flare guidance are identified; the advantages of the MLS in providing a transition capability from glide slope to altimetry are discussed; various flare algorithms are tabulated; flare antenna option is presented with configuration decision guidelines; and flight test results are shown that demonstrate the guidance capability of the elevation antenna in the approach threshold vicinity.
DESCRIPTORS: (*AIRCRAFT, *Landing), AVIONICS,
CARD ALERT: 652, 715

745704 ID NO.- EI770745704
TRENDS IN AIRCRAFT LANDING SYSTEMS.
Moore, R. A.; Cooper, H. W.; Littlepage, R. S.
Westinghouse Def & Electron Syst Cent, Baltimore, Md
IEEE Electron and Aerosp Syst Conv (EASCON '76), Rec, Washington, DC, Sep 26-29 1976 Publ by IEEE (Cat n 76CH1154-4 EASCON), New York, NY, 1976 Pap 11A, 14 p
This paper describes the present anticipated contributions of two systems of approach and landing guidance $EM DASH$ VHF/UHF Instrument Landing System (ILS), and Microwave Landing System (MLS). The first part of the paper is a brief history of aircraft approach and landing guidance. This is followed by a discussion of the large recent improvements in ILS through new engineering developments. Key features of the five national proposals for MLS competing for being identified as the international standard are described along with the most apparent improvements the MLS systems will provide. 24 refs
DESCRIPTORS: (*AIRCRAFT, *Landing),
IDENTIFIERS: INSTRUMENT LANDING SYSTEMS
CARD ALERT: 652

743329 ID NO.- EI770643329
MODERNIZED SSR SYSTEM.
Hirashima, Yuzo; Koshio, Tatsukichi; Takano, Hisao; Suzuki, Sakae; Okada, Kazuhisa
NEC, Tokyo, Jpn
NEC Res Dev n 43 Oct 1976 p 59-68 CODEN: NERAU
The secondary surveillance radar system (SSR), together with primary radar, has been widely employed as a sensor for air traffic control (ATC) according to the ICAO recommendations. For the past several years, ATC automation, involving SSR Mode-C data, has been promoted on a world-wide basis, and the importance of the SSR has been increasing year by year. From this point of view, the technical problems confronting the SSR and their solutions, such as sharp cutoff antenna, monopulse technique, improved SLS (side lobe suppression), beacon target processing, etc., and the standard SSR sensor involving the beacon target extractor applying some of these new techniques are discussed. 9 refs.
DESCRIPTORS: (*RADAR, *Surveillance Application), (AIR TRANSPORTATION, Traffic Control),
CARD ALERT: 716, 431

729263 ID NO.- EI770529263
MIKROWELLEN-ANFLUG- UND LANDESYSTEME. $left bracket$ Microwave Flight and Landing Systems $right bracket$.
Anon
NTZ Nachr Z NTZ Commun J v 29 n 4 Apr 1976 p 305-306 CODEN: NNNCAZ
The microwave landing system DLS is described. It is designed to replace the present standard ILS in 1985. The idea and advantages of the DLS concept are presented. 1 ref. In German.
DESCRIPTORS: (*AIRCRAFT, *Landing),
CARD ALERT: 652

721810 ID NO.- EI770421810
MLS $EM DASH$ A PRACTICAL APPLICATION OF MICROWAVE TECHNOLOGY.
Cox, Richard M.; Sebring, James R.
Bendix Commun Div, Baltimore, Md
IEEE Trans Microwave Theory Tech v MTT-24 n 12 Dec 1976 p 964-971 CODEN: IETMAB
A brief system overview of the U. S. candidate of the microwave landing system (MLS) is presented. Practical implementation of two types of ground antenna designs are presented, including measured data. Phased array designs are presented as high-performance implementations. Lens array designs have proven to be acceptable solution for limited-scan medium-performance requirements.
DESCRIPTORS: (*AIRCRAFT, *Landing), (AIRPORTS, Instruments), (AIRCRAFT INSTRUMENTS, Microwaves),
IDENTIFIERS: INSTRUMENT LANDING SYSTEMS
CARD ALERT: 652, 431

714571 ID NO.- EI770314571
COMMUTATED DOPPLER MICROWAVE LANDING SYSTEM FOR AIRCRAFT $EM DASH$ 2.
Barratt, R. S.; Chambers, J. M.
Plessey Radar Res Cent, Havant, Engl
Syst Technol n 23 Mar 1976 p 21-28 CODEN: SYTEAX
In an earlier issue (published by author R. S. Barratt in Syst Technol n 21 Jun 1975 p 15-21), the background to the Microwave Landing System (MLS), which will eventually replace the Instrument Landing System (ILS), was outlined. The present article briefly updates the background and describes the ground equipment for the Doppler MLS submitted by the UK to ICAO for adoption as the international standard. 1 ref.
DESCRIPTORS: (*AIRCRAFT, *Landing), MICROWAVE DEVICES, RADAR SYSTEMS,
CARD ALERT: 652, 714, 716

707424 ID NO.- EI770207424
EFFECT OF MULTIPLE PATH APPROACH PROCEDURES ON RUNWAY LANDING CAPACITY.
Tosic, Vojin; Horonjeff, Robert
Univ of Calif, Berkeley
Transp Res v 10 n 5 Oct 1976 p 319-329 CODEN: TRREBK
The objective of this research is to find out whether the introduction of Microwave Landing System (MLS) and consequently multiple approach paths can bring an increase in runway landing capacity. A model is developed which is capable of computing the expected ultimate landing runway capacity, under Instrument Landing System (ILS) and MLS conditions, when aircraft population characteristics and Air Traffic Control separation rules are given. This model can be applied in situations when only a horizontal separation between aircraft approaching a runway is allowed, as well as when both vertical and horizontal separation are possible. 6 refs.
DESCRIPTORS: (*AIRCRAFT, *Landing), AIRPORT RUNWAYS, (TRANSPORTATION, Traffic Control), MATHEMATICAL MODELS,
CARD ALERT: 431, 652, 912, 921

705397 ID NO.- EI770105397
SYMPOSIUM UEBER RADARTECHNIK, 1974. $left bracket$ Symposium on Radar Engineering, 1974 $right bracket$.
Anon
Dtsch Ges fuer Ortung und Navig, Duesseldorf, Ger
Symp ueber Radartech, Munich, Ger, Nov 13-15 1974 Publ by Dtsch Ges fuer Ortung und Navig (Buech der Ortung und Navig), Duesseldorf, Ger, 1974 471 p
Proceedings includes 24 papers, all in German, dealing with radar problems associated with marine, air and space navigation, with solutions to the suppression of interference signals, with antennas, and with signal and data processing. Topics considered include: microwave circuits, microwave landing systems, phase-controlled antennas, interference and clutter suppression, aircraft and aerospace tracking as well as information processing in electronic radar systems. In German.
DESCRIPTORS: *RADAR, RADAR SYSTEMS, ANTENNAS, AIRCRAFT, SHIPS, MICROWAVE DEVICES,
CARD ALERT: 431, 434, 652, 671, 716, 714

678933 ID NO.- EI761278933
TIME REFERENCE MICROWAVE LANDING SYSTEM MULTIPATH CONTROL TECHNIQUES.
Kelly, R. J.
Bendix Corp, Baltimore, Md
Navigation v 23 n 1 Spring 1976 p 42-58 CODEN: NAVIB3
An exposition of the multipath control techniques used in the Microwave Landing Systems (MLS) is presented. The system is in conformance with requirements established by the All Weather Operations Panel of the International Civil Aviation Organization (ICAO). It satisfies the international need for a new nonvisual approach and landing system by utilizing a TRSB technique which has evolved from more than fifteen years of development effort on scanning beam systems in the United States. 5 refs.
DESCRIPTORS: (*AIRCRAFT, *Landing),
CARD ALERT: 652

650244 ID NO.- EI760850244
UNITED STATES PROGRAM TO ICAO FOR A NEW NON-VISUAL APPROACH AND LANDING SYSTEM.
Del Balzo, Joseph M.; Jones, Stanley R.
Fed Aviat Adm, Washington, DC
AGARD Conf Proc n 188 1976 on Plans and Dev for Air Traffic Control Syst, Cambridge, Mass, May 20-23 1975 Pap 27, 20 p CODEN: AGCPAV
The paper describes the Microwave Landing System (MLS) design being proposed to the International Civil Aviation Organisation (ICAO) by the United States of America, which is a precision approach and landing guidance system designed to meet the needs of all types of aircraft, civil and military, throughout the world through at least the balance of this century. It is an air-derived data system, i.e., ground stations will generate coded signals which will enable an airborne receiver/processor unit to derive precise azimuth angle, elevation angle, and range data, which are suitable for display to the pilot or for use by an automatic flight control system. Inherent in the MLS design is the incorporation of a ground-to-air data link which will provide runway identification, condition of runway, operational status of the MLS, and weather information.
DESCRIPTORS: (*AIR TRANSPORTATION, *Traffic Control), (AIRCRAFT, Landing).
CARD ALERT: 431, 652

647831 ID NO.- EI760747831
AIRPORT SURVEILLANCE RADAR SUPPLIED TO ZAMBOANGA INTERNATIONAL AIRPORT, PHILIPPINES.
Takeuchi, Seiichiro; Tsuda, Atsuo; Tanaka, Tetsuzo
Kamukai Works, Jpn
Toshiba Rev (Int Ed) n 101 Jan-Feb 1976 p 16-19 CODEN: TRIEA8
Described is an airport surveillance radar (ASR) designed to meet not only the requirements for ASR systems specified by ICAO, but also for modern air traffic control systems. It incorporates the latest techniques, which improve detection capability in spite of ground clutter problems usually encountered in the immediate area of airports. These techniques include digital MTI, video integrator, and rf amplifier.
DESCRIPTORS: (*RADAR, *Surveillance Application), (AIRPORTS, Ground Equipment).
CARD ALERT: 716, 431

643201 ID NO.- EI760743201
MICROWAVE LANDING SYSTEM REQUIREMENTS FOR STOL OPERATIONS.
Brown, Stuart C.; Burrous, Clifford N.; Goka, Tsuyoshi; Park, Kun E.
NASA Ames Res Cent, Moffett Field, Calif
J Aircr v 13 n 2 Feb 1976 p 140-148 CODEN: JAIRAM
The operational/functional requirements for the new microwave landing system (MLS) are examined for STOL operations. The study utilizes a nonlinear six-degree-of-freedom simulation of a De Havilland Buffalo C-8A aircraft and automatic flight control system to assess the MLS/STOL accuracy and coverage requirements for the azimuth, DME, primary elevation, and flare elevation functions. The aircraft performance is statistically determined for representative curved flight paths through touchdown. A range of MLS errors and coverages, environmental disturbances, and navigation filtering are investigated. The filter configuration is shown to have a significant effect on the ability of the controlled aircraft to cope with the MLS navigation errors. The study indicates that the STOL MLS requirements are included within the range of proposed MLS configurations. 14 refs.
DESCRIPTORS: (*AIRCRAFT, VTOL/STOL, *Landing), MICROWAVE DEVICES.
CARD ALERT: 652, 714, 715

628804 ID NO.- EI760528804
SOME SYSTEM CONSIDERATIONS FOR MLS AIRBORNE PROCESSORS.
Beneke, J.; Wightman, C.
Calspan Corp, Buffalo, NY
Navigation v 22 n 1 Spring 1975 p 35-46 CODEN: NAVIB3

The microwave landing system (MLS) is under development by the Federal Aviation Administration (FAA) as a replacement for the VHF/UHF ILS. The following are some of the features this microwave landing aid will provide: accurate guidance signals that will be relatively insensitive to weather, terrain; airport structures, and other aircraft; flexible flight paths as an aid to noise abatement and increased airport capacity; accurate guidance signals that permit less separation of parallel runways; low cost versions appropriate for smaller airfields; and a common civil/military system having compatible tactical military versions. Currently the two competing techniques, scanning beam and Doppler scan, are under evaluation for selection as the United States Microwave Landing System. The selected system technique will be a candidate for submission to the International Civil Aviation Organization (ICAO) evaluation of new landing systems. A common international MLS is the ultimate goal of the FAA developmental program. The discussions presented here are based upon some results of a techniques analysis program sponsored by the FAA. Some of the system requirements will be considered with respect to their effect upon design parameters in the airborne processors for angle guidance data. Performance in typical multipath environments will be analyzed with the differences noted between the scanning beam and Doppler scan techniques. Techniques for rejecting multipath interference from other aircraft and airport structures will be discussed since they are essential in the MLS to provide precision guidance in a severe multipath environment. 4 refs.

62 654 ID NO.- EI760421654
DOPPLER MLS DEVELOPMENT.
Blair, P. K.; Sandbank, C. P.
Stand Telecommun Lab, Harlow, Engl
Electr Commun v 50 n 4 1975 p 298-304 CODEN: ELCMAX

The development of a Doppler microwave landing system from its initial proposal through experimental and prototype phases is outlined. It is being submitted to ICAO by the United Kingdom government as a possible successor to the standard ILS approach and landing system. The need for a new system is due to changes in aviation and the predicted patterns of airport operations, as well as the desire to overcome the shortcomings of existing ILS. A comprehensive Doppler MLS system was designed including forward and back azimuth systems, an elevation system of 90 $lambda$ aperture, field and integral monitoring units, and a range of airborne receivers. Stringent system evaluation, including field and flight tests, is being undertaken in Britain. system performance so far has been excellent.

DESCRIPTORS (*AIRCRAFT, *landing), AIR NAVIGATION.
IDENTIFIERS: AIRCRAFT LANDING SYSTEMS
CARD ALERT: 652, 431

621652 ID NO.- EI760421652
PHASE CODED PRECISION DME FOR MLS.
Dodington, S. H.; Lang, A.; LeGrand, J
IT&T Headquarters, New York, NY
Electr Commun v 50 n 4 1975 p 287-291 CODEN ELCMAX
L-band DME systems can be made to have the same accuracy as microwave landing system (MLS) C-band DME systems by using phase coding techniques. The phase coded MLS/DME sets avoid interference, use common hardware, and are compatible with existing DME installations.
DESCRIPTORS: (*AIRCRAFT, *Landing), AIR NAVIGATION.
IDENTIFIERS: AIRCRAFT LANDING SYSTEMS
CARD ALERT: 652, 431

621598 ID NO.- EI760421598
SOLID STATE AMPLIFIERS FOR DME BEACONS.
Graziani, D.
FACE-Stand, Milan, Italy
Electr Commun v 50 n 4 1975 p 273-277 CODEN: ELCMAX
Two new solid state amplifiers have been developed for DME applications. The FSD-30 beacon amplifier provides an output power of 200 w and is suitable for ground DME beacons collocated with an ILS or MLS. This amplifier also drives a new 1 kW amplifier used in FSD-5 DME beacons for en route navigation.
DESCRIPTORS: *AIR NAVIGATION, AMPLIFIERS, ULTRAHIGH FREQUENCY.
IDENTIFIERS: RADIO BEACONS
CARD ALERT: 713, 431

616439 ID NO.- EI760316439
COMPATIBILITY AND THE FREQUENCY SELECTION PROBLEM.
Frazier, Robert A.
Ill Inst of Technol, Res Inst, Annapolis, Md
IEEE Trans Electromagn Compat v EMC-17 n 4 Nov 1975 p 248-254 CODEN IEMCAE
An automated model that calculates the frequency separation requirements for interference free operation of electronic systems located in a given environment is described. Using these frequency separation requirements, the model assigns a channel to each system in the environment based on the frequencies available to each. The model calculates inter system, antenna coupled interference levels only. It uses an iterative, but nonexhaustive, process which attempts to develop a compatible assignment. Preassignment checks are performed to determine if a complete assignment is impossible based on the number of frequencies available to each system and the separations between these frequencies. If an assignment is impossible, a partial assignment with the least number of deletions results. Using the preassignment checks, the model can be used to determine a channel scheme for a new system that will conserve spectrum space and allow compatible operation in any given environment. The results of a recent application of the model to an environment of microwave landing guidance systems including the proposed MLS is given.
DESCRIPTORS: *ELECTROMAGNETIC COMPATIBILITY, (RADIO, Frequency Allocation), (AIRCRAFT, Landing).
IDENTIFIERS: AIRCRAFT LANDING SYSTEMS
CARD ALERT: 711, 716, 652

607389 ID NO.- EI760207389
OVERVIEW OF THE UPGRADED THIRD GENERATION AIR TRAFFIC CONTROL SYSTEM.
Isreal, David R.
Fed Aviat Adm, Washington, DC
IEEE Electron and Aerosp Syst Conv (EASCON '74), Rec, Washington, DC, Oct 7-9 1974 p 244-249. Publ by IEEE (IEEE Publ 74CH0883-1 AES), New York, NY, 1974
The air traffic control system planned for use in the 1980's and beyond is now known as the Upgraded Third Generation System (UG3RD). It is designed to meet the FAA's goals of: (a) maintaining or improving safety, (b) constraining or reducing costs, and (c) increasing or improving performance. The system will be characterized by nine major features $EM DASH$ Intermittent Positive Control (IPC), the Discrete Address Beacon System (DABS), Area Navigation (RNAV), Microwave Landing System (MLS), increased automation, Airport Surface Traffic Control (ASTC), a Wake Vortex Avoidance System (WVAS), Flight Service Stations (FSS), and Aeronautical Satellites (AEROSAT).
DESCRIPTORS: (*AIR TRANSPORTATION, *Traffic Control).
CARD ALERT: 431

606352 ID NO.- E1760106352
INTERNATIONAL CONFERENCE ON SYSTEMS, MAN AND CYBERNETICS, PROCEEDINGS, 1974.
Anon
IEEE, New York, NY
Int Conf on Syst, Man and Cybern, Proc, Pap, Dallas, Tex, Oct 2-4 1974 Publ by IEEE (74 CHO 908-4 SMC), New York, NY, 1974, 538 p
This publication includes 96 complete papers (also two abstracts and one summary). More than one-third of the papers concern modeling of various aspects of societal systems, including dynamic modeling. Health care delivery and other subjects of biomedical engineering interest are also extensively treated. Other subjects covered include air transportation systems (particularly microwave landing systems and air-traffic control), pattern recognition systems and associated learning and adaptive systems; robot vehicles for unmanned space exploration (rovers) and their manipulator devices; system estimation and identification; solar and other alternative energy sources; technological forecasting (near-term); interactive group telecommunications and automatic programming. Ninety-four selected papers are indexed separately.
DESCRIPTORS: *SYSTEMS SCIENCE AND CYBERNETICS, BIOMEDICAL ENGINEERING.
IDENTIFIERS: SOCIETAL SYSTEMS, SOCIOECONOMIC MODELS, DYNAMIC MODELING, HEALTH CARE, INTERACTIVE COMPUTING
CARD ALERT: 731, 723, 461

600551 ID NO.- EI760100551
SIMULATOR EVALUATION OF MANUALLY FLOWN CURVED MLS APPROACHES.
Sager, Dennis
MITRE Corp, McLean, Va
Int Conf on Syst, Man and Cybern, Proc, Dallas, Tex, Oct 2-4 1974 p 104-109. Publ by IEEE (74 CHO 908-4 SMC), New York, NY, 1974
Pilot performance in flying horizontally curved instrument approaches was analyzed by having nine test subjects fly curved approaches in a fixed-base simulator. Approaches were flown without an autopilot and without a flight director. Evaluations were based on deviation measurements made at a number of points along the curved approach path and on subject questionnaires. Results indicate that pilots can fly curved approaches, though less accurately than straight-in approaches; that a moderate wind does not seriously affect curve flying performance; and that there is no major performance difference between 60 $degree$ and 90 $degree$ turns. 4 refs.
DESCRIPTORS: (*AVIATORS, *Ability Testing), (AIRCRAFT, Landing).
IDENTIFIERS: MICROWAVE LANDING SYSTEMS
CARD ALERT: 431, 912, 652

600290 ID NO.- EI760100290
INVOLVING THE EXPERT AND AVIATION COMMUNITY IN THE DECISION MAKING STRUCTURE OF THE U. S. MLS PROGRAM.
Jensen, Gene
Fed Aviat Adm, Washington, DC
Int Conf on Syst, Man and Cybern, Proc, Dallas, Tex, Oct 2-4 1974 p 161-165. Publ by IEEE (74 CHO 908-4 SMC), New York, NY, 1974
This paper describes the decis[illegible]ing structure being used to define the U S microwave lano ng system (MLS) design that will be offered to the International Civil Aviation Organization for consideration as the new standard replacing the existing instrument landing system (ILS). Essential prerequisites of such an offering include thoroughness in the underlying technical work and agreement by the user community that the new system is responsive to its diverse requirements in a cost-effective manner. 5 refs.
DESCRIPTORS: (*AIRCRAFT, *Landing), (AIR NAVIGATION, Research), (RADAR, Measurement Application).
IDENTIFIERS: MICROWAVE LANDING SYSTEMS
CARD ALERT: 652, 431, 716

600289 ID NO.- EI760100289
INTERNATIONAL AND U. S. DESIGN PROPOSALS FOR A MICROWAVE LANDING SYSTEM.
Meer, S. Ahmed; Jones, Stanley R.
MITRE Corp, McLean, Va
Int Conf on Syst, Man and Cybern, Proc, Dallas, Tex, Oct 2-4 1974 p 150-160. Publ by IEEE (74 CHO 908-4 SMC), New York, NY, 1974
This paper describes the preliminary designs being proposed to the International Civil Aviation Organization (ICAO) $EM DASH$ by the five countries having development programs on a new precision approach and landing system. The Australian, U. K. and U. S. Systems are all 'air-derived' and use the C-Band for the main functions of azimuth and elevation. Differences in these designs exist both in the use of Doppler or Scanning Beam concepts and in the use of time or frequency multiplexing of the azimuth and elevation signals. The French and German designs derive the angle information on the ground and transmit it to the aircraft via a data link. The French are proposing either an interferometric or a Doppler-effect reception technique, while the German approach is to employ the L-Band DME. The signal formats, ground systems, and avionics features of each design are described. Design parameters that influence system performance in terms of accuracy, integrity and implementability are identified. 8 refs.
DESCRIPTORS: (*AIRCRAFT, *Landing), (AIR NAVIGATION, Research), (RADAR, Measurement Application), TELECOMMUNICATION LINKS, MICROWAVE,
IDENTIFIERS: MICROWAVE LANDING SYSTEMS
CARD ALERT: 652, 431, 716

578433 ID NO.- EI751278433
APPLICATION OF MODERN CONTROL THEORY TO THE ANALYSIS OF AIRCRAFT AUTOLAND PERFORMANCE USING A SCANNING BEAM GUIDANCE SYSTEM.
Huber, Robert R.
AF Flight Dyn Lab, Wright-Patterson AFB, Ohio
Jt Autom Control Conf, 15th, Proc, Univ of Tex, Austin, Jun 18-21 1974 p 23-32. Publ by AIChE, New York, NY, 1974
A flexible digital computer analysis technique was developed to predict aircraft longitudinal landing performance from the FAA Category II window to touchdown. A Microwave Landing System (MLS) provided sampled data elevation angle guidance and continuous DME (Distance Measuring Equipment) information. Atmospheric disturbances including deterministic winds and random gusts as well as the MLS noise were modeled. The automatic flight control system was modeled as a linear optimal servo. A covariance propagation technique was used to predict the system statistical performance along the landing trajectory and at touchdown. Results are presented for a DC-8 aircraft for variations in atmospheric turbulence intensity levels and variations in landing guidance system data rate. 8 refs.
DESCRIPTORS: (*AIRCRAFT, *Landing),
IDENTIFIERS: AUTOMATIC LANDING
CARD ALERT: 652, 731

563908 ID NO.- EI751063908
AUTOMATIC CARRIER LANDING SYSTEMS.
Davies, W. D. T.
Bell Aerosp Co, Buffalo, NY
IEEE Conf on Decis and Control, 1974, incl Symp on Adapt Processes, 13th, Proc, Phoenix, Ariz, Nov 20-22 1974 Pap WPS. 3, p 135-136. Publ by IEEE (74CH0900-1 CS), New York, NY, 1974
A number of automatic carrier landing systems have been designed and proposed. These systems are all digital guidance and navigation computing systems, and enable $left double quote$ hands off $right double quote$ all automtic, all weather landings of properly equipped aircraft on to an aircraft carrier deck (or suitably equipped land based installations). Another design which is postulated for the near future is designated MLS $EM DASH$ the microwave landing system. This system offers greater potential in that it is capable of controlling: (a) a larger airspace, i. e., has more coverage; (b) more suitably equipped aircraft (at any given time), i. e., has more capacity; and (c) is also compatible with conventional landing fields, including civilian and other tactical air fields.
DESCRIPTORS: (*AIRCRAFT, MILITARY, *Deck Landing), (AIRCRAFT CARRIERS, Radio Equipment),
CARD ALERT: 404, 652, 672, 716

563894 ID NO.- EI751063894
COMMUTATED DOPPLER MICROWAVE LANDING SYSTEM FOR AIRCRAFT.
Barratt, Ron S.
Plessey Radar Res Cent, Havant, Engl
Syst Technol n 21 Jun 1974 p 15-21 CODEN: SYTEAX
A new Microwave Landing System (MLS) for aircraft, which will eventually replace the current Instrument Landing System (ILS) is reported. The article outlines the background to the work and presents the basic principles.
DESCRIPTORS: (*AIRCRAFT, *Landing),
IDENTIFIERS: MICROWAVE LANDING SYSTEMS
CARD ALERT: 652, 716

563890 ID NO.- EI751063890
AIR TRAFFIC CONTROL: UPGRADING THE THIRD GENERATION.
Israel, David R.
Fed Aviat Adm
Technol Rev v 77 n 3 Jan 1975 p 14-24 CODEN: TEREAU
The Air Traffic Control Advisory Committee has recommended evolution and improvement of the present ground-based and beacon-based system, with priority given to the greater use of automation and the introduction of a new concept of intermittent positive control. The Committee's recommendation is now referred to as the $left double quote$ Upgraded Third-Generation System $right double quote$, building on NAS Stage A and ARTS III, which constitute the $left double quote$ third generation $right double quote$ system. Since the decision to proceed on its engineering and development, the Upgraded Third Generation System has been transformed into a broad system design which is highlighted by (but not restricted to) nine key features. Hardware and software development programs associated with these features have been initiated, with most test and evaluation activity scheduled for the 1976-1977 period. At that time, final system design choices and implementation decisions will be made, leading to initial operational capabilities in the early 1980s. In addition to intermittent positive control, the other key features are a discrete-address beacon system, area navigation, a microwave landing system, automation beyond that of NAS Stage A and ARTS III, airport surface traffic control, a wake-vortex avoidance system, automated flight service stations, and aeronautical satellites for trans-ocean flights.
DESCRIPTORS: (*AIR TRANSPORTATION, *Traffic Control), AIR NAVIGATION,
CARD ALERT: 431

550096 ID NO.- EI750850096
WHITHER ALL WEATHER: THE AIRLINES' POINT OF VIEW OR A REVIEW OF ALL WEATHER ACRONYMITY.
Poritzky, Siegbert B.
Air Transp Assoc of Am, Washington, DC
SAE Prepr n 750602 for Meet May 6-8 1975, 9 p CODEN SEPPA8
A brief review of the airline industry's viewpoint on the all-weather operations progra... The paper describes airline policy views on landing g...nce requirements, on implementation of ground and airborne all-weather facilities, and on the relationship of the Microwave Landing System to all-weather operations. The paper discusses some necessary characteristics of flight control systems and new cockpit displays for the achievement of more complex and more efficient approaches to runways. The paper expresses an airline man's views with respect to Independent Landing Monitors, visibility enhancement devices, and Air Traffic Situation Displays.
DESCRIPTORS: (*AVIATION, *Meteorology),
CARD ALERT: 431, 443

550095 ID NO.- EI750850095
WHITHER ALL WEATHER, AN AIRPLANE MANUFACTURER'S POINT OF VIEW.
Tobie, Harold N.
Boeing Commer Airplane Co
SAE Prepr n 750601 for Meet May 6-8 1975, 5 p CODEN SEPPA8
Automatic landing has been developed to the point where the the wide-bodied jets have it as basic equipment. The techniques presently employed are generally founded upon the technology of the last two decades $EM DASH$ especially with respect to analog computation and gyroscope references Several new techniques are now available which can substantially improve the autoland systems for the next generation of transport aircraft. These include airborne digital computers, the use of integrated air-data and strapdown airplane motion reference systems, expanded use of automatic system test, and the development and employment of the Microwave Landing System (MLS).
DESCRIPTORS: (*AVIATION, *Meteorology), (AIRCRAFT, TRANSPORT, Electronic Equipment).
CARD ALERT: 431, 443, 652, 715

549790 ID NO.- EI750849790
PROPELLER MODULATION EFFECTS ON A SCANNING-BEAM MICROWAVE LANDING SYSTEM.
Pope, Jack M.; Staehle, William N.
NASA, Ames Res Cent, Moffett Field, Calif
SAE Prepr n 750521 for Meet Apr 8-11 1975, 11 p CODEN: SEPPA8
The results of a systems study and ground test of the effects of propeller modulation on a time-multiplexed, scanning-beam microwave landing system (MLS) are presented. Propeller modulation effects are analyzed in terms of spacing between receiving antenna and propeller, propeller blade width, and propeller speed. Principal study conclusions: (1) scanning beam MLS is susceptible to errors due to synchronous propeller modulation; (2) the number of synchronous interference multiples increases as the number of propeller blades increases and as the data rate decreases; (3) the probability of synchronous interference decreases at higher data rates; and (4) MLS receiver susceptibility to propeller modulation depends upon the dynamic response of the receiver automatic gain control and the respective tracking loops. 13 refs.
DESCRIPTORS: (*AIRCRAFT, *Electronic Equipment), MICROWAVE DEVICES, SIGNAL INTERFERENCE,
IDENTIFIERS: MICROWAVE LANDING SYSTEMS
CARD ALERT: 652, 715, 714, 711

542637 ID NO.- EI750742637
FLIGHT DEMONSTRATION OF THE FEASIBILITY OF A SCANNING BEAM MICROWAVE LANDING SYSTEM.
Farris, David W
Lockheed-Ga Co, Marietta
Soc of Flight Test Eng, Symp, 5th Annu, Proc, Anaheim, Calif, Aug 7-9 1974 Sess 2, p 63-78. Publ by Soc of Flight Test Eng, Lancaster, Calif, 1974
This paper describes the flight test program to demonstrate the feasibility of a Bendix/Bell Scanning Beam Microwave Landing System, conceived, designed, and developed under a contract with the Federal Aviation Administration The reasons for a new landing system, the requirements, the technical concepts, and descriptions of the feasibility hardware are discussed together with the flight test program, preliminary results, and conclusions
DESCRIPTORS: (*AIRCRAFT, *Landing),
CARD ALERT: 652

528472 ID NO.- EI750528472
GROUND BASED SYSTEMS.
Anon
Aircr Eng v 47 n 2 Feb 1975 p 4-7, 17 CODEN AIENAF
A description is given of new air traffic control facilities being developed in Great Britain. These include an air traffic control center, which will have responsibility for supersonic operations over the Atlantic, as well as local operations in Britain, a distributed data processing system; a three-dimensional radar which can provide slant-range, bearing, and height simultaneously; new Doppler VOR navigational aids; a microwave landing system; automatic test equipment for various frequency ranges; and a new computer-controlled radar simulator.
DESCRIPTORS: (*AIR TRANSPORTATION, *Traffic Control), AIR NAVIGATION, (DATA PROCESSING, Data Handling),
CARD ALERT: 431, 723

528471 ID NO.- EI750528471
RADIO AIDS FOR AIRCRAFT LANDING, SHORT-RANGE NAVIGATION, AND SECONDARY RADAR SYSTEMS.
Pakholkov, Georgiy A.
All-Union Radio Res Inst of Sci Work, USSR
Astronaut Aeronaut v 13 n 2 Feb 1975 p 36-43 CODEN: ASAEA4
Basic facilities used by the Soviet civil aviation for ATC, air navigation, and aircraft landing are reviewed. The Soviet SP-50-M aircraft landing system differs from the ILS system with respect to the principle of operation of the course and the glide beacons, as well as with respect to circuit arrangements and technological solutions employed in the equipment. In the Soviet Union, the problem of mutual employment of both Soviet and ICAO systems has been solved by employing a composite radio receiver type $left double quote$ KURS-MP $right double quote$ operating in SP-50, ILS, and VOR modes. A high-precision Rho-Theta system is used in the Soviet Union for short-range navigation. However, azimuth is determined somewhat differently from methods used in VOR and TACAN systems. The secondary radar system of the Soviet Union differs from the corresponding international system mainly with respect to the frequency band used, structure of the interrogation and reply signals, and composition and volume of information transmitted from on board the plane
DESCRIPTORS: (*AIR TRANSPORTATION, *Traffic Control), (AIRCRAFT, Landing), AIR NAVIGATION, RADAR.
CARD ALERT: 431, 652, 716

514265 ID NO.- EI750314265
MLS PROGRAM: PHASE II.
Edwards, Jack W.
Fed Aviat Adm, Washington, DC
IEEE Wescon Tech Pap v 17, for Meet, San Francisco, Calif, Sep 11-14 1973, Pap 24/1, 9 p CODEN: WETPA4
The National Plan for Development of the Microwave Landing System (MLS) for aircraft is reviewed and the current status discussed. Phase II, Feasibility Demonstration, is now underway and culminates with the major decision of a five year program, namely, the selection of the best technique for continued development. Phase II is described in terms of objectives, issues, planning considerations and content. 2 refs.
DESCRIPTORS: (*AIRCRAFT, *Landing), MICROWAVE DEVICES.
CARD ALERT: 652, 714

505171 ID NO. EI750105171
REQUIRED RADIO NAVIGATION AN AIR FORCE NAVIGATOR'S POINT OF VIEW.
Lee, Leonard C
US Air Force Acad, Colo
Natl Radio Navig Symp, Proc., Washington, DC, Nov 13-15 1973 p 117-120. Publ by Inst of Navig, Washington, DC, 1973
Five areas of military aviation are reviewed in which radio navigation systems can play an important role: arrival/departure, over land over water navigation, command and control, weapon delivery/reconnaissance and rescue. The available systems for each area are discussed and their advantages and disadvantages outlined. The paper concludes that future military radio aid configurations should include Omega, Loran C, Loran D and ILS/microwave landing systems. Additionally, until the full development of area navigation systems such as VOR and TACAN will be required to be compatible with the present airway structures. This configuration could be used by all types of mission aircraft to some degree until the systems are denied by the enemy. Not to use them would seem a waste of capability.
DESCRIPTORS: (*RADIO NAVIGATION, *Military Application), AIR NAVIGATION, AVIATION, MILITARY.
IDENTIFIERS: OMEGA NAVIGATION SYSTEM, LORAN C, LORAN D, HYPERBOLIC NAVIGATION SYSTEMS, MICROWAVE ILS
CARD ALERT: 716, 404, 431

446006 ID NO - EI740846006
NATIONAL MICROWAVE LANDING SYSTEM (MLS).
Edwards, Jack W.
Fed Aviat Adm, Washington, DC
SAE Prepr n 740345 for Meet Apr 2-5 1974, 8 p CODEN SEPPA8

The microwave landing system (MLS) is being developed as the next generation approach and landing system to replace the present worldwide instrument landing system (ILS). In order to satisfy diverse users such as civil and military aviation and conventional and V/STOL aircraft, the MLS employs compatible modular configurations. The five year National MLS Development Program, half over, has just completed a hardware feasibility demonstration phase, is about to choose the best technique, either scanning beam or Doppler scan, and in the next phase will select a single national system from among competing contractors. Meanwhile, the International Civil Aviation Organization has initiated a program directed toward the selection of a new $left double quote$ nonvisual approach and landing system $right double quote$. The United States is one of five member countries proposing candidates for international standardization. Operational advantages provided by the MLS include far greater flying precision and flexibility, including curved or segmented approaches in three dimensions; and flare guidance for all-weather automatic landing capability, resulting in greater safety while increasing airport capacities. At the same time, on a compatible basis, the economic and performance needs of general aviation are being satisfied.

DESCRIPTORS: *AIRCRAFT, AIRCRAFT INSTRUMENTS.
IDENTIFIERS: MICROWAVE LANDING SYSTEMS
CARD ALERT: 652

446003 ID NO.- EI740846003
NEW DESIGN AND OPERATING TECHNIQUES FOR IMPROVED TERMINAL AREA COMPATIBILITY.
Reeder, John P.; Taylor, Robert T.; Walsh, Thomas M.
NASA Langley Res Cent, Hampton, Va
SAE Prepr n 740454 for Meet Apr 30-May 2 1974, 67 p CODEN: SEPPA8

Current aircraft operating problems that must be alleviated for future high-density terminal areas are safety, dependence on weather, congestion, energy conservation, noise, and atmospheric pollution. The MLS under development by FAA provides increased capabilities over the current ILS. It is, however, necessary and urgent to develop the airborne system's capability to take maximum advantage of the MLS capabilities in order to solve the terminal area problems previously mentioned. A major limiting factor in longitudinal spacing for capacity increase is the trailing vortex hazard. Promising methods for causing early dissipation of the vortices are being explored. Also, flight procedures for avoiding the hazard will be explored.

DESCRIPTORS: (*AIR TRANSPORTATION, *Traffic Control), AIRPORTS, (AIRCRAFT, TRANSPORT, Landing).
CARD ALERT: 431, 652

439037 ID NO.- EI740739037
INTERNATIONAL AIR SAFETY SEMINAR, 26TH ANNUAL, 1973.
Baier, John W.; Jones, J. M.; Bensmiller, Arthur C.
Int Air Saf Semin, 26th, Annu, Tech Summ, Lisbon, Port, Nov 14-17 1973 Publ by Flight Saf Found, Inc, Arlington, Va, 1973, 208 p

Following is a continuation of a list of titles and authors: Automation Radar Terminal Systems ARTS III. By John W. Baier. Impact of Microwave Landing System on Safety. By J. M. Jones. Air Transportation of Hazardous Materials. By Arthur C. Bensmiller.

DESCRIPTORS: (*AVIATION, *Accident Prevention), (AIRCRAFT, Safety Factor).
CARD ALERT: 401, 431, 652, 914

424215 ID NO.- EI740524215
NONLINEAR TRAJECTORY-FOLLOWING AND CONTROL TECHNIQUES IN THE TERMINAL AREA USING MLS NAVIGATION SENSOR.
Madden, P.; Desai, M.
Mass Inst of Technol, Cambridge
Navigation v 20 n 4 Winter 1973-1974 p 285-295 CODEN: NAVIB3
Guidance and control techniques have been developed to permit accurate nonlinear path-following in the terminal area using an MLS & DME data-base. The elements of the system including trajectory generation, mean-wind estimation, feedforward and perturbation control are described and the performance of the integrated system delineated. The investigation was made with the aid of a sophisticated digital simulation, including modeling of the sensor and environmental noise. A conventional jet transport was the subject aircraft. A conclusion of the investigation was that the integrated guidance and control system was adequate to the task of path tracking with errors within the resolution of ATC radar. A corollary is that a degraded MLS, operating at low-scan rates provides navigational data of sufficient accuracy to perform the curved approach task. 7 refs.
DESCRIPTORS: (*AIR TRANSPORTATION, *Traffic Control).
CARD ALERT: 431

417279 ID NO.- EI740417279
MLS SCANNING-BEAM ANTENNA IMPLEMENTATION.
Sebring, J. R.; Ruth, J. K.
Bendix Commun Div, Towson, Md
Microwave J v 17 n 1 Jan 1974 p 41-44, 46 CODEN: MCWJAD
A description is given of the Bendix/Bell MLS Scanning Beam System, an air-derived data system operating primarily in C-band. Angular position of the aircraft is measured with respect to ground generated fan beams that are electronically scanned in ttheir narrow direction across the coverage sectors in both azimuth and elevation. An airborne receiver/processor extracts from the scanning beam the modulated angle data, corresponding to the line-of-sight angle from the ground antenna to the aircraft. 3 refs.
DESCRIPTORS: (*AIRCRAFT, *Electronic Equipment).
IDENTIFIERS: MICROWAVE LANDING SYSTEM
CARD ALERT: 652, 715

410813 ID NO.- EI740310813
MLS $EM DASH$ NAVIGATION, GUIDANCE, AND CONTROL.
Neal, G. L.
Collins Radio Co, Cedar Rapids, Iowa
Navigation v 20 n 3 Fall 1973 p 230-244 CODEN: NAVIB3
The general problem in the application of the microwave landing system (MLS) as a terminal navigation tool, as an aid to vehicle guidance, and as position control feedback element ground-based aid is discussed from a flight control engineer's viewpoint emphasizing subtleties of the system characteristics. Safety in flight is discussed with respect to guidance requirements for separation, control requirements for monitoring, and integrity of the ground station itself. 8 refs.
DESCRIPTORS: *AIR NAVIGATION, (AIR TRANSPORTATION, Traffic Control).
IDENTIFIERS: MICROWAVE LANDING SYSTEM
CARD ALERT: 431

405097 ID NO.- EI740205097
USE OF MLS ELEVATION DATA FOR FLARE-OUT GUIDANCE.
Sanders, Lon L
ITT Gilfillan, Van Nuys, Calif
Inst of Navig, Natl Aerosp Meet, Proc, Washington, DC, Mar 13-14 1973 p 133-138. Publ by ION, Washington, DC, 1973
The issues associated with the microwave landing system (MLS) elevation data or altimeter information for flare-out guidance are analyzed. Technical limitations of altimeter at some airports and for some aircraft are described. Discussion includes consideration of airport factors, aircraft and autopilot equipment, MLS ground equipment, and cost factors. With standardizing of touchdown zone parameters, MLS flare guidance appears both technically and economically justified. 5 refs.
DESCRIPTORS: *AIR NAVIGATION, (AIRCRAFT, Landing), AIRPORTS, NAVIGATION.
CARD ALERT: 431, 652, 716

405094 ID NO.- EI740205094
MLS-NAVIGATION, GUIDANCE, AND CONTROL.
Neal, G. L.
Collins Radio Co, Cedar Rapids, Iowa
Inst of Navig, Natl Aerosp Meet, Proc, Washington, DC, Mar 13-14 1973 p 109-118. Publ by ION, Washington, DC, 1973
Discussion of the application of the microwave landing system as a terminal area navigation tool, as an aid to vehicle guidance, and as a position control feedback element. The discussion is made from a flight control engineer's viewpoint with the emphasis on subtelties of the system characteristics that can greatly impact its eventual usefulness. Safety in flight is also discussed with respect to guidance requirements for separation, control requirements for monitoring, and integrity of the ground station itself. 9 refs.
DESCRIPTORS: *AIR NAVIGATION, (AIRCRAFT, Landing) NAVIGATION.
CARD ALERT: 431, 652, 716

405093 ID NO.- EI740205093
BENDIX/BELL MLS SIGNAL-IN-SPACE.
Kelly, R. J.
Bendix Corp, Towson, Md
Inst of Navig, Natl Aerosp Meet, Proc, Washington, DC, Mar 13-14 1973 p 97-108. Publ by ION, Washington, DC, 1973
The Bendix/Bell Microwave Landing System (MLS) is an air-derived sample data system operating at microwave frequencies using scanning narrow beam antennas which generate a signal-in-space. The MLS signal-in-space provides guidance information proportional to an aircraft's lateral and vertical displacement from a selected flight profile. A detailed description is given of the techniques and rationale used to generate and detect the MLS signal. Emphasized in the rationale are the system requirements developed by Bendix/Bell in their recently completed MLS Technique Analysis Study for the FAA. These requirements lead Bendix/Bell to choose the electronically scanned phased line array as the most adaptive technique to generate the angle guidance function. 8 refs.
DESCRIPTORS: *AIR NAVIGATION, (AIRCRAFT, Landing), NAVIGATION,
CARD ALERT: 431, 652, 716

405090 ID NO.- EI740205090
NONLINEAR TRAJECTORY-FOLLOWING AND CONTROL TECHNIQUES IN THE TERMINAL AREA USING THE MICROWAVE LADING SYSTEM NAVIGATION SENSOR.
Madden, Paul; Desai, Mukund
Mass Inst of Technol, Cambridge
Inst of Navig, Natl Aerosp Meet, Proc, Washington, DC, Mar 13-14 1973 p 24-34. Publ by ION, Washington, DC, 1973
Guidance and control techniques have been developed to permit accurate nonlinear path-following in the terminal area using a microwave landing system (MLS) navigation sensor as the primary data source. The elements of the system including trajectory generation, mean-wind estimation, feedforward and perturbation control are described, and the performance of the integrated system delineated. The investigation was made with the aid of a sophisticated digital simulation, including modeling of the sensor and environmental noise. A conventional jet transport was the subject aircraft. It has been found that the integrated guidance and control system was adequate to the task of path tracking with errors within the resolution of the air traffic control (ATC) radar. 7 refs.
DESCRIPTORS: *AIR NAVIGATION, (AIRCRAFT, Landing),
CARD ALERT: 431, 652

353641 ID NO.- EI731153641
INSTRUMENTATION IN THE AEROSPACE INDUSTRY, VOLUME 19.
Everett, Seymour; Buck, Robert M.; Bierach, Karl F.; Quinn, George H.; Werner, Edgar; Harris, James; Fain, Richard A.; Harvey, N.; Johnston, M. B.; Houben, W. B.; Turner, G. S.; Milligan, R. Vincent; Warner, Peter; Kroell, C. K.; Gadd, C. W.; Schneider, D. C.
ISA Aerosp Instrum Symp, Int, 19th, Proc, Las Vegas, Nev, May 21-23 1973 Publ by ISA, Pittsburgh, Pa, 1973, 312 p
Following is the continuation of the list of titles and authors. Microwave Landing System (MLS) Development Program. By Seymour Everett. From AICRBS to DABS/ADL. By Robert M Buck. Wake Vortex Sensing, Processing and Display. By Karl F Bierach. FAA Omega/VLF Navigation Development Programs. By George H. Quinn. Toward Inexpensive Measurement of the Front and the Content of Effluent Outfalls Released into Bodies of Water. By Edgar Werner and James Harris. Strain Gaging. Alive and Well and Living on the North Atlantic. By Richard A. Fain. Exhaust Emissions Analysis System for Aircraft Gas Turbine Engines. By N. Harvey, R. Johnston, W. B. Houben, and G. S. Turner. New Techniques in Measuring Plastic Strain in a Memory Material. By R. Vincent Milligan. European Approach to Dummy Design. By Peter Warner. Biomechanics in Crash Injury Research. By C. K. Kroell, C. W. Gadd, and D. C. Schneider.
DESCRIPTORS: *INSTRUMENTS, OCEANOGRAPHY, (AUTOMOBILES, Safety Devices).
CARD ALERT: 471, 662, 914, 944

338028 ID NO.- EI730838028
AIR TRAFFIC CONTROL SYSTEMS.
Rosien, R. A.; Sanders, L. L.; Holme, N.; Hunter, I. M.; Diamond, P. M.; Louet, J.; DeMarines, V. A.; Thompson, R. L.; Parsons, J. L.; Moreau, R.; Hopkin, V. D.; Stoddart, D. L.; Innes, L.; Milosevic, Lj.; Mollie, P.
AGARD Conf Proc n 105, 1973, Var Pagings CODEN: AGCPAV
Following is the continuation of the list of titles and authors of 32 papers presented: Performance of the Doppler Microwave Landing System in a Multipath Environment. By R. A. Rosien and L. L. Sanders. Landing Guidance System - Hermes By N. Holme. Forward Area Homing and Landing Guidance Concept for Military Aircraft. By I. M. Hunter. Potential of a System of Satellites as a Part of an Air Traffic Control System. By P. M. Diamond. Systeme TAM-TAM $left bracket$ TAM-TAM System $right bracket$. By J. Louet. Derivation of a Wide Area Position Location Capability Using a Synchronized Time Division Multiple Access Communication System. By V. A. DeMarines and R. L. Thompson. SECANT - A Solution to the Problem of Mid-Air Collisions. By J. L. Parsons. Dispositif francais d'anticollision de type temps- frequence-analyse critique de resultats d'essais. $left bracket$ French Time-Frequency Type Anticollision Device - Critical Analysis and Results of a Study $right bracket$. By R. Moreau. Human Factors Problems in Conflict Detection and Resolution. By V. D. Hopkin. Problems Involved in A. T. C. Automation. By D. L. Stoddart. Man-Computer Interface Problem in Terminal Automation. By L. Innes. Integration des fonctions de communication, de navigation, d'identification et de controle de trafic. $left bracket$ Integration of the Communication, Navigation, Identification, and Traffic Control Functions $right bracket$. By Lj. Milosevic and P. Mollie. In English and French.
DESCRIPTORS: (*AIR TRANSPORTATION, *Traffic Control), AIR NAVIGATION, TELECOMMUNICATION LINKS, AEROSPACE VEHICLE TRACKING.
CARD ALERT: 431, 716

338027 ID NO.- EI730838027
AIR TRAFFIC CONTROL SYSTEMS.
Noll, R. B.; Zvara, J.; Simpson, R. W.; Park, S. K.; Straeter, T. A.; Hogge, J. E.; DeCelles, J. L.; Burke, E. J.; Burroughs, K.; Hughes, N. H.; Grossman, C.; Daniels, T. E.; Carlson, D. N.; Seacord, C. L.
AGARD Conf Proc n 105, 1973, Var Pagings CODEN: AGCPAV
Following is the continuation of the list of titles and authors of 32 papers presented: Analysis of Terminal A. T. C. System Operations. By R. B. Noll, J. Zvara and R. W. Simpson. Analytic Study of Near Terminal Area Optimal Sequencing and Flow Control Techniques. By S. K. Park, T. A. Straeter and J. E. Hogge. Real World Situation Display for all Weather Landing. By J. L. DeCelles, E. J. Burke and K. Burroughs. Influence of the Future Landing Guidance Systems on Integration of Short Take-Off and Landing and Conventional Air Traffic at a Major Airport. By N. H. Hughes. ... Air Traffic Management Now Through 1980. By C. Grossman and T. E. Daniels. Functional Design of Microwave Landing System (MLS) Airborne Equipment as Influenced by Ground Equipment Configuration and Aircraft Type. By D. N. Carlson and C. L. Seacord.
DESCRIPTORS: (*AIR TRANSPORTATION, *Traffic Control), AIR NAVIGATION, TELECOMMUNICATION LINKS, AEROSPACE VEHICLE TRACKING.
CARD ALERT: 431, 716

332623 ID NO.- EI730732623
INSTRUMENT LANDING SYSTEMS.
Sanders, Lon L.; Fritch, Vincent John Jr.
ITT Gilfillan, Van Nuys, Calif
IEEE Trans Commun v COM-21 n 5 May 1973 p 435-454 CODEN: IECMBT
This paper is intended to present a summary of the status of the progress toward a third-generation instrument landing system. Section II is a brief outline of the background of ILS system together with some of the efforts to develop the new MLS ... the limitations of ILS and the goals of MLS are summarized. The system definition issues decided by the RTCA are presented in Section III. The competing techniques of Doppler and scanning beam are described in Section IV and the major issues associated with the choice between them are presented in Section V. Section VI summarizes the conclusions drawn from the history and expected future of MLS. 63 refs.
DESCRIPTORS: (*AIRCRAFT, *Landing), AIRCRAFT INSTRUMENTS, (AIRCRAFT, Electronic Equipment), (AIR TRANSPORTATION, Traffic Control).
CARD ALERT: 431, 652, 715

321238 ID NO.- EI730421238
IEEE INTERNATIONAL CONVENTION DIGEST. SYNOPSES OF PAPERS PRESENTED, NEW YORK, NY, MAR 20-23 1972.
Hannan, P. W.; Gutman, J. H.; Giannini, R. J.; Redlien, H. W.; Zeltser, M. J.; Hopkins, J. B.; Holmstrom, F. R.; Haroules, G. G.; Brown, W. E.; Wagner, G. W.; Gross, G. J.; Jackson, P.; Wooster, R. D.; Reynolds, A. L.; Cuccia, C. L.
IEEE Int Conv Dig IEEE (72 CH0581-9), New York, 1972, 559 p
Following is part XXIII of the listing of 250 papers presented. New Cylindrical Electronic-Scan Antenna for Air Traffic Control. By P. W. Hannan, J. H. Gutman, and R. J. Giannini. Application of the Doppler Scanning Beam Concept to the Microwave Landing System. By H. W. Redlien and M. J. Zeltser. Cost-Effective Microwave Systems for Railroad and Automobile Safety Applications. By J. B. Hopkins and F. R. Holmstram. Millimeter Wave Sensor and Detector for Clear Air Turbulence. By G. G. Haroules, W. E. Brown and G. W. Wagner. Comparison of Various Functional Trimming Techniques. By G. J. Gross. Comparison of Techniques for Testing Hybrid Electronics Circuits. By P. Jackson. Techniques of Single & Multiple Fault Analysis of MSI Digital Logic Arrays. By R. D. Wooster. High Power CW Gunn Oscillator for Communication Applications. By A. L. Reynolds. Microwave Technology in Gigabit PSK Modulation and Demodulation in Digital Communications. By C. L. Cuccia.
DESCRIPTORS: *TELECOMMUNICATION, AIR TRANSPORTATION, INTEGRATED CIRCUITS, HYBRID, MICROWAVE DEVICES, INTEGRATED CIRCUIT MANUFACTURE.
IDENTIFIERS: COMMUNICATION SYSTEMS
CARD ALERT: 431, 713, 714, 716

248165 ID NO - EI72X048165
Choice of coordinates for microwave landing system
SANDERS LL
ITT Gilfillan Inc, Van Nuys, Calif
Role of Navigation in Airways Systems Development, Proc of ION Natl Air Meet, Apr 14-16 1971, Inst of Navig, 1971, p 207-35
Presents an analysis of the impact of conical coordinates on various airport equipment configurations and aircraft avionics installations. It is concluded that a signal format with provision for either planar or conical beams can minimize the risk of the technical uncertainties in the format. The impact on airborne equipment complexity is relatively small except for a limited class of VSTOL aircraft.
DESCRIPTORS: (*AIRCRAFT, *Landing), ELECTROMAGNETIC WAVES.
IDENTIFIERS: MICROWAVE LANDING GUIDANCE SYSTEMS
CARD ALERT: 652, 711

248164 ID NO - EI72X048164
TALAR, a modular step scan microwave landing system
HENF G
Singer-General Precision, Inc, Pleasantville, NY
Role of Navigation in Airways Systems Development, Proc of ION Natl Air Meet, Apr 14-16 1971, Inst of Navig, 1971, p 175-89
The operational experience and recent evaluation data pertaining to the performance of TALAR, a step scanned microwave landing system is reviewed. The data reviewed covers a period of approximately 10 yr. The basic functional operation of a step scan system is described. e . TALAR. A family of landing systems is then derived via modular interchange with the base line unit. Operational configurations such as short takeoff and landing, asynchronous split site, multiangle and multichannel are described.
DESCRIPTORS: (*AIRCRAFT, *Landing), ELECTROMAGNETIC WAVES.
IDENTIFIERS: TALAR, SCANNING BEAM SYSTEMS
CARD ALERT: 652, 711

C. INSPEC Database.

472149 B80055790, C80031934
MLS USER COMMITMENT IS NEEDED NOW
WHITNEY, M.F.
INTERAVIA (ENGL. ED.) (SWITZERLAND) VOL 35, NO 7 587-90 JULY 1980 Coden: INTRAL
Treatment: GENERAL,REVIEW-
JOURNAL PAPER-
THE BATTLE TO DECIDE ON THE BASIC TECHNIQUE FOR A NEW LANDING GUIDANCE AID, THE MICROWAVE LANDING SYSTEM (MLS), IS NOW HISTORY, AND HAS BEEN FULLY DOCUMENTED OVER RECENT YEARS WITH THE DECISION FINALLY MADE IN FAVOUR OF THE TIME REFERENCE SCANNING BEAM APPROACH, MLS NOW FACES ANOTHER TEST-TO BECOME FULLY IMPLEMENTED IN A REALISTIC TIME-FRAME AND ACCEPTED AS A REPLACEMENT FOR THE EXISTING INSTRUMENT LANDING SYSTEM (ILS). THIS PAPER DISCUSSES THE ORIGINS OF MLS, THE LIMITATIONS OF ILS, THE BENEFITS AND MEANS OF INTRODUCTION OF MLS SOME POSSIBLE PROBLEMS CAUSED BY THE DIFFERENCES IN TECHNIQUE BETWEEN MLS AND ILS ARE ALSO DISCUSSED
Descriptors: AIR-TRAFFIC CONTROL
Identifiers: MICROWAVE LANDING SYSTEM; MLS; TIME REFERENCE SCANNING BEAM; INSTRUMENT LANDING SYSTEM; ILS
Section Class Codes: B7650C, C3360L

472147 B80055785
MADGE' MOBILE MULTIPURPOSE MLS
GEISENHEYNER, S.
DEF. ELECTRON. (USA) VOL.12, NO.5 50, 52, 54, 58-9 MAY 1980 Coden: DEELDH
Treatment: GENERAL,REVIEW-
JOURNAL PAPER-
NATOes PORTABLE MICROWAVE LANDING SYSTEM CAN BE USED FOR MORE THAN MARGINAL WEATHER LANDING ASSISTANCE. THE JAM-RESISTANT SYSTEM IS ALSO ENVISIONED TO INCREASE PRECISION IN CLOSE AIR SUPPORT OPERATIONS FOR NAVIGATION AND ATTACK PURPOSES
Descriptors: MILITARY EQUIPMENT; AIR-TRAFFIC CONTROL; AIRCRAFT
Identifiers: MADGE; MOBILE MULTIPURPOSE MLS; PORTABLE MICROWAVE LANDING SYSTEM
Section Class Codes: B7650, B6320

464828 B80051563, C80031962
MODELING AND FLIGHT SIMULATION OF AN ACTIVE CONFIGURED AIRCRAFT UNDER MLS GUIDANCE
DANESI, A.; SMOLKA, S.; CHINAPPI, U
AEROSPACE SCHOOL OF ENGNG., ROME UNIV., ROME, ITALY
AGAR
$AGARD CONFERENCE PROCEEDINGS NO.268. MODELING AND SIMULATION OF AVIONICS SYSTEMS AND COMMAND, CONTROL AND COMMUNICATIONS SYSTEM $38/1-1 $198
$15-19 OCT. 197 $PARIS, FRANC
Publ: $AGAR $NEUILLY-SUR-SEINE, FRANC
$X+256+34 APPENDI
REPORT SECTION-
A NEW MATHEMATICAL FORMULATION IS PRESENTED TO INTEGRATE THE DIFFERENTIAL EQUATIONS MODELING A VEHICLE AUTOMATICALLY GUIDED ALONG A CURVILINEAR TRAJECTORY BY A MICROWAVE LANDING SYSTEM. THE AUGMENTED LINEAR STATE EQUATION IS GIVEN IN STANDARD PHASE VARIABLE FORM IN WHICH THE ALTITUDE PERTURBATIONS FROM THE REFERENCE TRAJECTORY AND NUMBERS OF ITS SUCCESSIVE DERIVATIVES ARE ASSUMED AS STATE VARIABLES INVOLVED IN A MULTI-FEEDBACK FLIGHT CONTROL SYSTEM WITH GAINS FIXED FOR A SATISFACTORY VEHICLE TRANSIENT BEHAVIOUR IN RESPONSE TO MLS LINK-UP COMMANDS. THE STATE EQUATION HANDLES SEPARATELY THE TRANSFER FUNCTION CHARACTERISTICS POLYNOMIAL WHILE THE DYNAMICAL EFFECTS OF THE SYSTEM ZEROS ARE INCLUDED IN THE ALGEBRAIC OUTPUT EQUATION RELATING THE ACTUAL ALTITUDE PERTURBATIONS TO THE STATE VARIABLES DEFINED. IN A RATHER FICTITIOUS FASHION, IN A STATE EQUATION. THE INITIAL CONDITIONS TO BE IMPOSED IN THE INTEGRATION PROCESS MUST BE CONSISTENT WITH THE PHYSICAL INITIAL CONDITIONS ON THE ACTUAL TRAJECTORY CONSIDERED. AND FOR THAT PURPOSE AN ORIGINAL MATHEMATICAL SOLUTION TO THE PROBLEM OF TRANSFORMING THE INITIAL CONDITIONS IMPOSED ON THE PHYSICAL STATE VARIABLES TO THE CORRESPONDING FICTITIOUS ONES IS ADVANCED ($ Refs)
Descriptors: LINEAR DIFFERENTIAL EQUATIONS; GROUND SUPPORT SYSTEMS; STATE-SPACE METHODS; AEROSPACE SIMULATION; RADIO DIRECTION-FINDING; DIGITAL SIMULATION
Identifiers: FLIGHT SIMULATION; ACTIVE CONFIGURED AIRCRAFT; DIFFERENTIAL EQUATIONS; CURVILINEAR TRAJECTORY; MICROWAVE LANDING SYSTEM; AUGMENTED LINEAR STATE EQUATION; ALTITUDE PERTURBATIONS; STATE VARIABLES; TRANSFER FUNCTION CHARACTERISTICS PO LYNOMIAL; INITIAL CONDITIONS; INTEGRATIO
Section Class Codes: B7650, B6330, B7620, C3360L, C7460, C4170

464827 B80051562, C80031962
A FLIGHT SIMULATION INVESTIGATION ON THE FEASIBILITY OF CURVED APPROACHES UNDER MLS GUIDANCE
ERKELENS, L.J.J.
NAT. AEROSPACE LAB., NLR, AMSTERDAM, NETHERLANDS
AGARD
AGARD CONFERENCE PROCEEDINGS NO.268. MODELING AND SIMULATION OF AVIONICS SYSTEMS AND COMMAND, CONTROL AND COMMUNICATIONS SYSTEMS 37/1-18 1980
15 19 OCT. 1979 PARIS, FRANCE
Publ: AGARD NEUILLY-SUR-SEINE, FRANCE
X+256+34 APPENDIX
Treatment: APPLIC-
REPORT SECTION
DESCRIBES A SIMULATION CONCERNING THE POSSIBILITIES OF EXECUTING LATERALLY CURVED APPROACHES WITH A WIDE BODY TYPE OF AIRCRAFT IN A MICROWAVE LANDING SYSTEM ENVIRONMENT THE APPROACH PATH VARIABLES WERE FINAL APPROACH INTERCEPT ALTITUDE AND ANGLE OF THE TURN AN EARTH FIXED CIRCULAR SEGMENT CONNECTED THE STRAIGHT PRETURN SEGMENT WITH THE FINAL SEGMENT A FLIGHT DIRECTOR OPERATING IN THE ILS TRACKING MODE, SUPPLIED WITH MINOR MODIFICATIONS IN THE ROLL BAR DRIVE, HAS BEEN USED AS THE PRIMARY INSTRUMENT FOR GUIDANCE ADDITIONAL PROVISIONS HAVE BEEN MADE TO ENABLE THE PILOT TO MONITOR THE APPROACH. IT TURNED OUT THAT APPROACHES WITH TURN ANGLES UP TO 180 DEGREES CAN BE CARRIED OUT SAFELY PROVIDED THAT THE ALTITUDE AT WHICH THE TURN IS COMPLETED IS NOT LESS THAN 305 M (1000 FT) SPECIAL PROVISIONS ARE NEEDED WITH RESPECT TO THE FLIGHT DIRECTOR ROLL BAR DRIVE, IN ORDER TO ACHIEVE ACCURATE TRACKING ON THE CURVED SEGMENT IN STRONG WIND CONDITIONS (6 Refs)
Descriptors: GROUND SUPPORT SYSTEMS; RADIO DIRECTION-FINDING; AEROSPACE SIMULATION; SAFETY; AIRPORTS
Identifiers: FLIGHT SIMULATION; FEASIBILITY OF CURVED APPROACHES; MLS GUIDANCE; FINAL APPROACH INTERCEPT ALTITUDE; FLIGHT DIRECTOR; ILS TRACKING MODE; ROLL BAR DRIVE; TURN ANGLES; TRACKING
Section Class Codes: B7650, B6330, B7620, C3360L, C7460

460304 B80051569
FLIGHT PROFILE INVESTIGATION FOR MICROWAVE LANDING SYSTEM
EMERSON, T.J.
AIR FORCE FLIGHT DYNAMICS LAB., WRIGHT-PATTERSON AFB, OH, USA
PROCEEDINGS OF THE NATIONAL AEROSPACE SYMPOSIUM AIR NAVIGATION-TODAY AND IN THE YEAR 2000 50-7 1979
25-27 APRIL 1978 ATLANTIC CITY, NJ, USA
Publ: INST NAVIGATION WASHINGTON, DC, USA
267
Treatment: APPLIC-
REPORT SECTION-
DESCRIBES THE SIMULATOR AND AIRCRAFT TEST CONFIGURATIONS, THE TEST SYLLABUS AND EARLY RESULTS (4 Refs)
Descriptors: RADIONAVIGATION; AEROSPACE SIMULATION; AEROSPACE TEST FACILITIES; AIR-TRAFFIC CONTROL
Identifiers: MICROWAVE LANDING SYSTEM; SIMULATOR; AIRCRAFT TEST CONFIGURATIONS; TEST SYLLABUS; FLIGHT PROFILE
Section Class Codes: B7650C, B7620, B6330

453943 B80046416, C80030566
AN MLS SIMULATION FACILITY
BENEKE, J.; WIGHTMAN, C.W.
CALSPAN ADVANCED TECHNOL. CENTER, BUFFALO, NY, USA
SCHWAB, L.M.; DOUGLAS, J.H. (Editors)
IEEE
TECHNOLOGY GROWTH FOR THE 80S. 1980 IEEE MTT-S INTERNATIONAL MICROWAVE SYMPOSIUM DIGEST 401-3 1980
28-30 MAY 1980 WASHINGTON, DC, USA
Publ: IEEE NEW YORK, USA
XX+511
Treatment: THEORETICAL-EXPERIMENTAL-
REPORT SECTION-
A MICROWAVE LANDING SYSTEM (MLS) SIMULATION FACILITY IS DESCRIBED THAT GENERATES DIRECT AND MULTIPATH C-BAND SIGNALS SUITABLE FOR EVALUATING AN AIRBORNE RECEIVER. TEST SCENARIOS AND DATA REDUCTION ARE ACCOMPLISHED BY A PDP 11/10 COMPUTER. TYPICAL TEST RESULTS ARE PRESENTED SOME FUTURE APPLICATIONS ARE CONSIDERED (4 Refs)
Descriptors: AEROSPACE SIMULATION
Identifiers: C-BAND SIGNALS; AIRBORNE RECEIVER; DATA REDUCTION; PDP 11/10 COMPUTER; MICROWAVE LANDING SYSTEM SIMULATION; TEST SCENARIOS
Section Class Codes: B7620, C7460

452433 B80046421, C80028882
THE ADVANCED FLIGHT DECK
WILSON, J.W.; HILLMAN, R.E.
BRITISH AEROSPACE, HATFIELD, ENGLAND
AERONAUT. J. (GB) VOL.84, NO.831 93-100 MARCH-APRIL 1980 Coden: AENJAK
Treatment: APPLIC-PRACTICAL APPLIC-
JOURNAL PAPER-
NEW DIGITAL EQUIPMENT FOR AUTOMATIC FLIGHT MANAGEMENT, THRUST CONTROL, FREQUENCY SELECTION AND ELECTRONIC COLOUR DISPLAYS HAS BEEN ORDERED AND IS BEING BUILT-THE NECESSARY TECHNOLOGY IS CLEARLY AVAILABLE TO IMPLEMENT DATA LINK, COLLISION AVOIDANCE, MLS, NAVSTAR AND SATCOM SYSTEMS. THE MAJOR CONSTRAINT IN THE TEXT IN THE NEXT TWO DECADES WILL NOT BE TECHNOLOGICAL BUT THE TIME AND COST INVOLVED IN ORGANISING THE INTEGRATION OF AIRCRAFT SYSTEMS AND THE PROVISION OF EXTERNAL AIDS
Descriptors: AEROSPACE CONTROL; AIRCRAFT INSTRUMENTATION
Identifiers: ADVANCED FLIGHT DECK; DIGITAL EQUIPMENT; AUTOMATIC FLIGHT MANAGEMENT; THRUST CONTROL; FREQUENCY SELECTION; ELECTRONIC COLOUR DISPLAYS; COLLISION AVOIDANCE; MLS; NAVSTAR; SATCOM; AIRCRAFT SYSTEMS
Section Class Codes: B7630, C3360L

444332 B80043357
A 25 WATT, 5 GHZ GAAS FET AMPLIFIER FOR MLS
TAKAYAMA, Y.; HONJO, K.
CENTRAL RES. LAB., NIPPON ELECTRIC CO. LTD., KAWASAKI, JAPAN
SCHWAB, L.M.; DOUGLAS, J.H. (Editors)
IEEE
TECHNOLOGY GROWTH FOR THE 80S. 1980 IEEE MTT-S INTERNATIONAL MICROWAVE SYMPOSIUM DIGEST 496-8 1980
28-30 MAY 1980 WASHINGTON, DC, USA
Publ: IEEE NEW YORK, USA
XX+511
Treatment: PRACTICAL APPLIC-
REPORT SECTION-
A 25-WATT, 29-DB GAIN, 5-GHZ FET AMPLIFIER FOR THE TRANSMITTER IN THE MICROWAVE LANDING SYSTEM HAS BEEN DEVELOPED USING PRACTICAL GAAS FETS ASSEMBLED IN CERAMIC PACKAGES WITH INTERNAL MATCHING NETWORKS. THIS FOUR-STAGE AMPLIFIER PROVIDES 30-WATT POWER OUTPUT WITH 18.5PERCENT POWER EFFICIENCY AT 17 DBM POWER INPUT LEVEL (5 Refs)
Descriptors: SOLID-STATE MICROWAVE CIRCUITS; MICROWAVE AMPLIFIERS; FIELD EFFECT TRANSISTOR CIRCUITS; III-V SEMICONDUCTORS; POWER AMPLIFIERS; GALLIUM ARSENIDE
Identifiers: 5 GHZ GAAS FET AMPLIFIER; MLS; TRANSMITTER; MICROWAVE LANDING SYSTEM; CERAMIC PACKAGES; INTERNAL MATCHING NETWORKS
Section Class Codes: B1220, B1350F

418885 B80037326
NEW COMMUTATED DOPPLER MICROWAVE LANDING SYSTEM
CONNOR, F.R.
CRANFIELD INST. OF TECHNOL., CRANFIELD, ENGLAND
ELECTRON. LETT. (GB) VOL 16, NO.10 365-6 9 MAY 1980
Coden ELLEAK
Treatment: NEW DEVELOPMENTS-THEORETICAL-
JOURNAL PAPER-
A NEW DESIGN FOR A DOUBLE SIDEBAND COMMUTATED DOPPLER SYSTEM FOR LANDING AIRCRAFT IS PROPOSED. IT IS CAPABLE OF PROVIDING ANGULAR INFORMATION IN ELEVATION AND AZIMUTH BY THE MEASUREMENT OF A DOPPLER FREQUENCY. FURTHERMORE, IT OFFERS THE POSSIBILITY OF DETECTING AND CORRECTING ANY MULTIPATH ERROR PRESENT IN THE DOPPLER SIGNAL (2 Refs)
Descriptors: DOPPLER EFFECT; MICROWAVE ANTENNAS; ANTENNA ARRAYS; AIR-TRAFFIC CONTROL
Identifiers: MICROWAVE LANDING SYSTEM; DOUBLE SIDEBAND COMMUTATED DOPPLER SYSTEM; DOPPLER FREQUENCY; DOPPLER SIGNAL; MULTIPATH ERROR DETECTION
Section Class Codes: B7650C, B5270F

401805 B80030915
DESIGN OF AN ELECTRONIC MODEL OF A MICROWAVE AIRCRAFT LANDING SYSTEM
NIKITIN, A.O.
RADIOTEKHNIKA, MOSKVA (USSR) VOL.34, NO.6 39-41 JUNE 1979 Coden: RATEAO
Trans In: TELECOMMUN. AND RADIO ENG. PART 2 (USA) VOL.34, NO.6 83-5 JUNE 1979 Coden: TCREAG
Treatment: PRACTICAL APPLIC~
JOURNAL PAPER~
AN ELECTRONIC MODEL OF AN ACTUAL RADIO SYSTEM FOR IMPROVING THE EFFICIENCY OF MICROWAVE LANDING SYSTEMS AND A METHOD OF MODELING THEIR SIGNALS AT THE SECOND IF STAGE OF THE ONBOARD RECEIVER ARE PROPOSED (5 Refs)
Descriptors: RADIONAVIGATION; MOBILE RADIO SYSTEMS; MODELLING
Identifiers: ELECTRONIC MODEL; MICROWAVE AIRCRAFT LANDING SYSTEM; RADIO SYSTEM; MODEL AIRCRAFT RADIO RECEIVER; RADIONAVIGATION
Section Class Codes: B6250F, B6330

387019 B80026431
AEROSPACE AND MILITARY
LOMBARDO, T.G.
IEEE SPECTRUM (USA) VOL.17, NO.1 75-80 JAN 1980 Coden: IEESAM
Treatment: GENERAL,REVIEW~
JOURNAL PAPER~
BRIEFLY DISCUSSES DEVELOPMENTS INCLUDING SPACE PROBES, HIGH-SPEED INTEGRATED CIRCUITS, AND MICROWAVE LANDING SYSTEM AIRPORT TESTS
Descriptors: SPACE VEHICLES; RADIONAVIGATION; SPACE COMMUNICATION LINKS
Identifiers: SPACE PROBES; MICROWAVE LANDING SYSTEM; AIRPORT TESTS; HIGH SPEED INTEGRATED CIRCUITS
Section Class Codes: B7610, B6330, B7630, B6250H

385751 B80024798
MULTIPATH PROPAGATION MEASUREMENTS BY DOPPLER TECHNIQUE
FORM, P.; SPRINGER, R.
TECH. UNIV. BRAUNSCHWEIG, BRAUNSCHWEIG, GERMANY
LUEG, H. (Editors)
AGARD
AGARD CONFERENCE PROCEEDINGS NO.239 DIGITAL COMMUNICATIONS IN AVIONICS 22/1-23 1979
5-9 JUNE 1978 MUNICH, GERMANY
Publ: AGARD NEUILLY-SUR-SEINE, FRANCE
VIII+476
Treatment: EXPERIMENTAL
REPORT SECTION~
IN THIS PAPER SOME MLS-FEATURES ARE DISCUSSED WITH RESPECT TO MULTIPATH PROPAGATION. FOR ILLUSTRATION OF SPECIFIC MULTIPATH EFFECTS, A DOPPLER-SHIFT MEASUREMENT TECHNIQUE WITH HIGH-ANGLE RESOLUTION IS PRESENTED, WHICH NEEDS SIMPLE ANTENNAS AND EQUIPMENT AND OFFERS EASY INTERPRETATION (15 Refs)
Descriptors: RADIOWAVE PROPAGATION; AIRCRAFT COMMUNICATION; RADIONAVIGATION
Identifiers: MLS; MULTIPATH PROPAGATION; DOPPLER SHIFT; RADIOWAVE PROPAGATION; MICROWAVE LANDING SYSTEM
Section Class Codes: B5210C, B6330

371467 880021220
PRECISION DME USING PULSE-COMPRESSION
SCHILLIGER, M.
(THOMSON CSF, PARIS, FRANCE
NAVIGATION (FRANCE) VOL 27, NO 108 387-401 OCT 1979
Coden: NVGNAL
Treatment: PRACTICAL APPLIC-
JOURNAL PAPER-
Languages: FRENCH
THE DME (DISTANCE MEASURING EQUIPMENT) HERE DESCRIBED CAN, IT IS CLAIMED, PRODUCE THE NECESSARY DEGREE OF ACCURACY (+OR- 20 FT) NECESSARY FOR A MICROWAVE LANDING SYSTEM, AT THE SAME TIME YIELDING THE 200 INDEPENDENT CHANNELS CONSIDERED ESSENTIAL DOPPLER HAVING BEEN REJECTED. THE CHOICE IS BETWEEN SHORT RISE-TIME PULSE AND PULSE-COMPRESSION SYSTEMS USING THE LATTER, THE REQUIRED NUMBER OF CHANNELS, WITH ADEQUATE SEPARATION, CAN BE OBTAINED WITH NO AUGMENTATION OF PEAK POWER. BY APPLYING MODERN SIGNAL PROCESSING TECHNOLOGY THE SOMEWHAT COMPLEX PROCEDURES ARE FULLY DESCRIBED (2 Refs)
Descriptors: DISTANCE MEASUREMENT; AIRCRAFT INSTRUMENTATION; RADIONAVIGATION
Identifiers: DME; DISTANCE MEASURING EQUIPMENT; MICROWAVE LANDING SYSTEM
Section Class Codes: B7320C, B7630, B6330

362356 B80016418, C80011727
MODERN SYSTEMS FOR AIR TRAFFIC CONTROL
JORGENSEN, P.A.
SELENIA SPA, ROME, ITALY
CONTROLLER (GERMANY) VOL.18, NO.3 35-7 SEPT. 1979
Coden: CTLRAP
Treatment: APPLIC-GENERAL,REVIEW-
JOURNAL PAPER-
DEALS WITH SYSTEMS AND EQUIPMENT WHICH CONVENIENTLY CAN BE PUT INTO OPERATION WITHIN A REASONABLE PERIOD. MORE FUTURISTIC TECHNIQUES LIKE AREA NAVIGATION, SATELLITE ASSISTED CONTROL, DABS, MLS ETC. SHOULD BE TAKEN INTO ACCOUNT FROM A PLANNING POINT OF VIEW, BUT THE ATC SYSTEM IN ITS PRESENT FORM, WITH GRADUAL EVOLUTION, IS MOST LIKELY TO REMAIN FOR AT LEAST ANOTHER DECADE OR TWO
Descriptors: AIR TRAFFIC COMPUTER CONTROL; RADAR APPLICATIONS
Identifiers: AIR TRAFFIC CONTROL; SYSTEMS; EQUIPMENT; EVOLUTION; RADAR
Section Class Codes: B7650C, B6320, C3360I, C7410F

340656 B80012008
MULTIPATH PROBLEMS IN AIRCRAFT APPROACH AIDS-A SOLUTION
VINCENT, R.P.
PHILIPS RES. LABS., REDHILL, ENGLAND
IEE
COLLOQUIUM ON MODERN TECHNIQUES FOR COMBATING MULTIPATH INTERFERENCE IN RADIO, RADAR AND SONAR SYSTEMS 4PP. 1979
12 NOV. 1979 LONDON, ENGLAND
Publ IEE LONDON, ENGLAND
38
Treatment: PRACTICAL APPLIC-
REPORT SECTION-
DISCUSSES THE APPLICATION OF TIME DELAY DISCRIMINATION TO A MICROWAVE LANDING SYSTEM AS A SOLUTION TO MULTIPATH PROBLEMS
Descriptors: AIR-TRAFFIC CONTROL; RADIOFREQUENCY INTERFERENCE
Identifiers: AIRCRAFT APPROACH AIDS; TIME DELAY DISCRIMINATION; MICROWAVE LANDING SYSTEM; MULTIPATH PROPAGATION
Section Class Codes: B7650, B5230

339636 B80010638, C80006586
ANGLE RESOLUTION OF A MLS PHASED ARRAY (AIR TRAFFIC CONTROL)
HSIAO, J.K.; SHELTON, J.P.
NAVAL RES. LAB., WASHINGTON, DC, USA
IEEE
1979 INTERNATIONAL SYMPOSIUM DIGEST ANTENNAS AND PROPAGATION 625-8 197 SY
II 18-22 JUNE 1979 SEATTLE, WA, USA
Publ: IEEE NEW YORK, USA
27+455
Treatment: APPLIC-EXPERIMENTAL-
REPORT SECTION-
DESCRIBES A COMPUTER SIMULATION TECHNIQUE FOR TESTING THE ANGULAR RESOLUTION OF A CONVENTIONAL LINEAR ARRAY AND A COMPACT ARRAY. LINEAR PHASED ARRAYS ARE USED FOR MICROWAVE TRANSMISSIONS FOR THE TIME REFERENCE SCANNING BEAM SYSTEM IN THE MICROWAVE LANDING SYSTEM MLS (2 Refs)
Descriptors: AIR-TRAFFIC CONTROL; DIGITAL SIMULATION; ANTENNA PHASED ARRAYS; RADIONAVIGATION; MICROWAVE ANTENNAS
Identifiers: MLS PHASED ARRAY; COMPUTER SIMULATION; ANGULAR RESOLUTION; COMPACT; MICROWAVE; TIME REFERENCE SCANNING BEAM SYSTEM; LANDING SYSTEM; AIR TRAFFIC CONTROL; ANTENNAS
Section Class Codes: B5270D, B7650C, C7410F

332773 B80004724, C80005298

313573 B80002424, C80001171
GCU, THE GUIDANCE AND CONTROL UNIT FOR ALL WEATHER APPROACH
BOHRET, H.
BODENSEEWERK GERATETECHNIK GMBH, UBERLINGEN, GERMANY
AGARD
AGARD CONFERENCE PROCEEDINGS NO.258. GUIDANCE AND CONTROL OF HELICOPTERS AND V/STOL AIRCRAFT AT NIGHT AND IN POOR VISIBILITY 20/11 1979
9-12 OCT. 1978 THE HAGUE, NETHERLANDS
Publ: AGARD NEUILLY-SUR-SEINE, FRANCE
VI + 238
Treatment: PRACTICAL APPLIC-
REPORT SECTION-
UTILIZING THE SETAC-MLS, THE GUIDANCE AND CONTROL UNIT GCU DEVELOPED BY BODENSEEWERK DEMONSTRATED IN FLIGHT TEST THE IMPROVEMENTS OF FUTURE LANDING PROCEDURES. THE SHORT-CAPTURED STEEP APPROACH PATHS GENERATED BY THE GCU CAN BE FLOWN MANUALLY WITH THE FLIGHT DIRECTOR INSTRUMENT DUE TO THE HIGH ACCURACY OF SIGNAL PROCESSING BY MEANS OF KALMAN FILTER TECHNIQUES. THE PAPER PRESENTS THE TECHNICAL EQUIPMENT AND DISCUSS THE FLIGHT TEST RESULTS (5 Refs)
Descriptors: AIRCRAFT INSTRUMENTATION
Identifiers: GUIDANCE AND CONTROL UNIT; ALL WEATHER APPROACH ; SETAC-MLS; BODENSEEWERK; KALMAN FILTER TECHNIQUES; FLIGHT TEST RESULTS
Section Class Codes: B7630, C3360L, C3210

297459 B79048781, C79029413
THE INTERIM STANDARD MICROWAVE LANDING SYSTEM
TOMAN, D.J.
TULL AVIATION CORP., ARMONK, NY, USA
NAVIGATION (USA) VOL.25, NO.3 298-309 JAN. 1978
Coden: NAVIB3
Treatment: PRACTICAL APPLIC-
JOURNAL PAPER-
CONCEIVED AS A BRIDGE BETWEEN THE VHF/UHF ILS AND THE FUTURE INTERNATIONAL STANDARD MICROWAVE LANDING SYSTEM, ISMLS PROVIDES ALL THE OPERATIONAL BENEFITS OF CONVENTIONAL ILS WITH FEW OF THE TECHNICAL HEADACHES. SEVERAL ISMLS INSTALLATIONS ARE PRESENTLY COMMISSIONED FOR PUBLIC USE SERVING IN SOME CASES AT SITES WHERE SITE PREPARATION COSTS FOR CONVENTIONAL ILS WOULD HAVE EXCEEDED BY FAR THE TOTAL COST OF THE REST OF THE ISMLS INSTALLATIONS IN COMMISSION. THESE FACILITIES ARE THE WORLD@S FIRST PUBLIC-USE MICROWAVE LANDING SYSTEMS. THE PAPER DESCRIBES THE ISMLS, ITS SIGNAL FORMAT, HOW IT COPES WITH DIFFICULT SITING PROBLEMS AND HOW IT MANAGES TO BRIDGE THE GAP BETWEEN THE EXISTING VHF/UHF SYSTEM AND THE FUTURE WORLDWIDE SYSTEM, SERVING THE IMMEDIATE NEEDS OF THE AVIATION COMMUNITY
Descriptors: RADIONAVIGATION; AIRCRAFT; AIR-TRAFFIC CONTROL
Identifiers: INTERIM STANDARD MICROWAVE LANDING SYSTEM; SIGNAL FORMAT; VHF/UHF SYSTEM
Section Class Codes: B6330, B7650C, C3360L

297456 B79048778
NEW INSTRUMENT LANDING SYSTEM-PROBABLY LONG TRANSITION PERIOD BEFORE MLS TAKES OVER
FORSSELL, B.
ELEKTRO (NORWAY) VOL.92, NO.9 6-10 3 MAY 1979 Coden: EERDAV
Treatment: GENERAL,REVIEW-
JOURNAL PAPER-
Languages: NORWEGIAN
THE METHOD OF OPERATION OF THE CURRENT INSTRUMENT LANDING SYSTEM (ILS). ITS WEAKNESSES AND WHY IT NEEDS A REPLACEMENT ARE DISCUSSED. THE FRSB AND DMLS SCHEMES PROPOSED ARE DESCRIBED
Descriptors: AIRCRAFT INSTRUMENTATION; RADIO DIRECTION-FINDING
Identifiers: INSTRUMENT LANDING SYSTEM
Section Class Codes: B6330, B7650C

271750 B79040699

GUIDANCE ACCURACY CONSIDERATIONS FOR THE MICROWAVE LANDING SYSTEM L-BAND PRECISION DME

KELLY, R.J.; LABERGE, E.F.C.
COMMUNICATIONS DIV., BENDIX CORP., BALTIMORE, MD, USA

IEEE
PROCEEDINGS OF THE IEEE 1979 NATIONAL AEROSPACE AND ELECTRONICS CONFERENCE NAECON 1979 1130-41 1979
III 15-17 MAY 1979 DAYTON, OH, USA
Publ: IEEE NEW YORK, USA
500
Treatment: PRACTICAL APPLIC-
REPORT SECTION-

THE MICROWAVE LANDING SYSTEM (MLS), DEVELOPED BY THE FAA UNDER A JOINT DOT/FAA, DOD, AND NASA PROGRAM IS DESIGNED FOR EXTENDED REQUIREMENTS IN VOLUMETRIC COVERAGE, GUIDANCE ACCURACY, AND INTEGRITY TO MEET THE INCREASING NEEDS OF AVIATION. IT IS TO BE A COMMON CIVIL-MILITARY SYSTEM AND PROVIDE A LEVEL OF OPERATIONS AND EQUIPMENTS SUITABLE FOR ALL CLASSES OF USERS. INTEGRAL TO THE MICROWAVE LANDING SYSTEM CONCEPT IS THE DISTANCE MEASURING EQUIPMENT (DME) WHICH MEASURES RANGE TO TOUCHDOWN. IT MUST SATISFY TO THE MAXIMUM EXTENT POSSIBLE, APPROACH AND LANDING OPERATIONAL REQUIREMENTS FOR ALL USER AIRCRAFT (CTOL, STOL, AND VTOL). THESE REQUIREMENTS DICTATE AIRCRAFT RANGE AND RANGE RATE MEASUREMENTS WITH AN ACCURACY AT LEAST AN ORDER OF MAGNITUDE MORE PRECISE THAN THOSE NEEDED FOR THE CONVENTIONAL TERMINAL DME APPLICATION. THIS PAPER PRESENTS A CONSISTENT ACCURACY SPECIFICATION SUITABLE FOR MLS OPERATIONAL REQUIREMENTS AND A PRECISION DME (PDME) IMPLEMENTATION COMMON FOR CTOL, STOL, AND VTOL (26 Refs)

Descriptors: DISTANCE MEASUREMENT; GROUND SUPPORT SYSTEMS
Identifiers: MICROWAVE LANDING SYSTEM; L-BAND; AVIATION; DISTANCE MEASURING EQUIPMENT; ACCURACY SPECIFICATION; RANGE TO TOUCHDOWN MEASUREMENT
Section Class Codes: B7650, B7320C

DIALOG File13: INSPEC - 78-80/Iss24 (Copr. IEE) See File 12(69-77) (Item 132 of 169) User 3007 5jan81

232848 B79027969
MICROWAVE LANDING SYSTEM' THE ROAD TO MONTREAL
CONTROLLER (GERMANY) VOL.17, NO.3 29-31 SEPT. 1978
Coden: CTLRAP
Treatment: GENERAL,REVIEW-
JOURNAL PAPER-
AFTER OUTLINING THE LIMITATIONS OF THE INSTRUMENT LANDING SYSTEM (ILS) THE ARTICLE DISCUSSES THE COMPETING SYSTEMS WHICH HAVE BEEN PROPOSED TO AS REPLACEMENTS
Descriptors: RADIO DIRECTION-FINDING; AIR-TRAFFIC CONTROL; REVIEWS
Identifiers: INSTRUMENT LANDING SYSTEM; MICROWAVE LANDING SYSTEM
Section Class Codes: B6330

221910 B79024566, C79015253
A STILLBORN SYSTEM? COMMENTS ON AN ICAO INSTRUMENT LANDING SYSTEM
BAIER, W.
RADIO-TV-ELECTRON. (SWITZERLAND) VOL.38, NO.8 38 AUG. 1978 Coden: RTESBN
Treatment: PRACTICAL APPLIC-
JOURNAL PAPER-
Languages: GERMAN
CRITICAL COMMENTS ARE MADE ABOUT THE TRSB (TIME REFERENCED SCANNING BEAM) INSTRUMENT LANDING SYSTEM TO BE MADE MANDATORY BY 1985. THE PROBLEMS OF AERIAL ARRAYS WITH PHASE CONTROL ARE MENTIONED, THE NEED FOR MONITORING RECEIVERS IS STATED AND THE PROBLEMS OF REFLECTIONS AND GHOSTS ARE REFERRED TO
Descriptors: RADIONAVIGATION; AIRCRAFT; AIR-TRAFFIC CONTROL
Identifiers: ICAO INSTRUMENT LANDING SYSTEM; TRSB; CRITICAL REVIEW
Section Class Codes: B7630, B7650C, B6330, C3360L

192625 B79014178, C79009086
THE CHOICE OF MLS TECHNIQUE BY THE O.A.C.I
FOMBONNE, P.
NAVIGATION (FRANCE) VOL.26, NO.104 383-98 OCT. 1978 Coden: NVGNAL
Treatment: GENERAL,REVIEW-
JOURNAL PAPER-
Languages: FRENCH
THE ALL WEATHER OPERATIONS PANEL OF THE INTERNATIONAL CIVIL AVIATION ORGANISATION (O.A.C.I.) HAS SELECTED THE TIME REFERENCE SCANNING BEAM MICROWAVE LANDING SYSTEM (TRSBMLS) AS A SUCCESSION TO THE INSTRUMENT LANDING SYSTEM. THE MAJOR STAGES IN THE DEVELOPMENT OF THIS CHOICE ARE REVIEWED HISTORICALLY, AND THE PRINCIPLES OF THE FORMER AND PRESENT SYSTEMS ARE EXAMINED
Descriptors: RADIONAVIGATION; AIRCRAFT; AIR-TRAFFIC CONTROL
Identifiers: MLS TECHNIQUE; TIME REFERENCE SCANNING BEAM MICROWAVE LANDING SYSTEM
Section Class Codes: B6330, B7650C, C3360L

190084 B79014180
MICROWAVE LANDING SYSTEMS
POGUST, F
REV. TELEGR. ELECTRON. (ARGENTINA) VOL.66, NO.787 637-42 AUG. 1978 Coden: RTELB2
Treatment: GENERAL,REVIEW PRACTICAL APPLIC
JOURNAL PAPER-
Languages: SPANISH
DESCRIBES A TIME REFERENCE SCANNING BEAM SYSTEM, A SYSTEM INVOLVING A DOPPLER METHOD OF DETERMINING THE ANGLE OF APPROACH, AND A SYSTEM EMPLOYING INTERFEROMETER TECHNIQUES. THE TRACAL SYSTEM OF GROUND CONTROL APPROACH WHICH ENABLES AIRPORT CONTROLLERS TO GROUND GREATER NUMBERS OF AIRCRAFT IS DESCRIBED. THE DEVELOPMENT, MANUFACTURE AND ADOPTION OF A BEAM SYSTEM WITH SWEEPS IN AZIMUTH AND ELEVATION CAPABLE OF GIVING A PILOT HIGHLY ACCURATE INFORMATION, IS ALSO DISCUSSED
Descriptors: RADIONAVIGATION; AIR-TRAFFIC CONTROL; GROUND SUPPORT SYSTEMS
Identifiers: ANGLE OF APPROACH; INTERFEROMETER TECHNIQUES; GROUND CONTROL APPROACH; AIRPORT CONTROLLERS; AZIMUTH; ELEVATION; MICROWAVE LANDING SYSTEM; RADIONAVIGATION
Section Class Codes: B6330, B7650C

179440 B79010514, C79006587
MLS CLEARED FOR TAKE-OFF? (MICROWAVE LANDING SYSTEM)
BOYLE, D.
INTERAVIA (ENGL. ED.) (SWITZERLAND) VOL.33, NO.10 991-3 OCT. 1978 Coden: INTRAL
Treatment: GENERAL,REVIEW-PRACTICAL APPLIC-
JOURNAL PAPER-
THE TRSB SYSTEM DESCRIBED IS ONE IN WHICH GROUND-BASED TRANSMITTING EQUIPMENT PROVIDES POSITION INFORMATION TO A RECEIVER IN THE AIRCRAFT. THE SIGNALS TRANSMITTED FROM THE GROUND ARE TIME-MULTIPLEXED, PROVIDING INFORMATION IN SEQUENCE ON A SINGLE CARRIER FREQUENCY FOR ALL OF THE ANGULAR FUNCTIONS, INCLUDING AZIMUTH, ELEVATION, FLARE-OUT GUIDANCE AND A BACK-AZIMUTH SIGNAL FOR MISSED APPROACH GUIDANCE. A TIME SLOT IS ALSO AVAILABLE FOR A 360 DEGREES AZIMUTH GUIDANCE SIGNAL, AS ONE OF THE PROVISIONS FOR FUTURE GROWTH CAPABILITY IN THE SYSTEM. RANGE MEASUREMENTS ARE ALSO SUPPLIED, EMPLOYING A CONVENTIONAL DME TECHNIQUE
Descriptors: AIR-TRAFFIC CONTROL; GROUND SUPPORT SYSTEMS; RADIONAVIGATION
Identifiers: MLS; TRSB; TRANSMITTING EQUIPMENT; POSITION INFORMATION; CARRIER FREQUENCY; ANGULAR FUNCTIONS; AZIMUTH; ELEVATION; MISSED APPROACH GUIDANCE; TIME SLOT; MICROWAVE LANDING SYSTEM; TIME MULTIPLEXED SIGNAL; BACK AZIMUTH SIGNAL; AIRCRAFT RECEIVER; FLAREOUT GUIDANCE; RANGE MEASUREMENTS; DME
Section Class Codes: B7650C, B6330, C3360L

177426 B79010516, C79003690
THE CHOICE OF A NEW INTERNATIONAL LANDING SYSTEM BY THE ICAO
FOMBONNE, M.P.
THOMSON-CSF, PARIS, FRANCE
ONDE ELECTR. (FRANCE) VOL.58, NO.11 715-20 NOV. 1978 Coden: ONELAS
Treatment: GENERAL,REVIEW-
JOURNAL PAPER-
Languages: FRENCH
THE INTERNATIONAL ILS (INSTRUMENT LANDING SYSTEM) WHICH WAS STANDARDIZED IN 1947, IS PLAGUED WITH CONSTITUTIONAL DEFICIENCIES THAT A MORE MODERN SYSTEM MIGHT NOT PRESENT. SINCE 1969, VARIOUS SOLUTIONS PROPOSED BY SEVERAL NATIONS, INCLUDING FRANCE, HAVE BEEN COMPARED AND EVALUATED. THIS INTENSE TECHNICAL EFFORT CULMINATED IN APRIL 1978 WHEN ICAO (INTERNATIONAL CIVIL AVIATION ORGANISATION) SELECTED THE TIME REFERENCE SCANNING BEAMS SYSTEM PROPOSED BY THE UNITED STATES AND AUSTRALIA AS SUCCESSOR OF ILS. THIS SYSTEM, WHICH OPERATES AT 5 GHZ, INDICATES THE AIRCRAFT AZIMUTH AND ELEVATION INSIDE A WIDE VOLUME AND SHOULD BE LESS SENSITIVE THAN ILS TO SITE EFFECTS
Descriptors: AIR-TRAFFIC CONTROL; GROUND SUPPORT SYSTEMS; RADIONAVIGATION
Identifiers: INTERNATIONAL LANDING SYSTEM; INTERNATIONAL CIVIL AVIATION ORGANISATION; TIME REFERENCE SCANNING BEAMS SYSTEM; AIRCRAFT LANDING SYSTEMS; 5 GHZ OPERATION
Section Class Codes: B7650C, B6330, C3360L

166698 C79003692
SIMULATION OF AUTOMATIC LANDING APPROACHES FOR PASSENGER PLANES FOR THE EXAMPLE OF A BOEING 707
DEHN, C.
INST. FUR REGELUNGSTECH., TECH. UNIV., BRAUNSCHWEIG, BRAUNSCHWEIG, GERMANY
REGELUNGSTECHNIK (GERMANY) VOL.26, NO.8 251-8 AUG. 1978 Coden: RLSTA5
Treatment: THEORETICAL-
JOURNAL PAPER-
Languages: GERMAN
QUESTIONS OF SAFETY AND OF BETTER CAPACITY UTILIZATION ARE CONSIDERED. THE PROBLEMS CAN BE SOLVED BY APPLYING NEW MICROWAVE LANDING SYSTEMS AND BY BETTER COOPERATION OF THE PILOT WITH THE FLIGHT CONTROLLER. BY MEANS OF COMPUTER SIMULATIONS, THE LIMIT CASE OF THE COMPLETELY AUTOMATIC APPROACH, ACCORDING TO NOISE REDUCING AND CAPACITY AUGMENTING STEEP LANDING PROCEDURES ARE INVESTIGATED. THE RESULTS CAN BE USED AS A REFERENCE BASIS FOR MANUALLY CONTROLLED APPROACHES (12 Refs)
Descriptors: AEROSPACE CONTROL; AIRCRAFT; AEROSPACE SIMULATION
Identifiers: AUTOMATIC LANDING; PASSENGER PLANES; BOEING 707; SAFETY; MICROWAVE LANDING SYSTEMS; PILOT; FLIGHT CONTROLLER; COMPUTER SIMULATIONS; STEEP LANDING PROCEDURES
Section Class Codes: C3360L, C7460

164828 B79006268
LANDING AIRCRAFT UNDER POOR CONDITIONS
KELLY, R.J.; REDLIEN, H.W.; SHAGENA, J.L.
BENDIX CORP., CINCINNATI, OH, USA
IEEE SPECTRUM (USA) VOL.15, NO.9 52-7 SEPT. 1978 Coden: IEESAM
Treatment: PRACTICAL APPLIC-
JOURNAL PAPER-
DESCRIBES THE PRINCIPLE OF THE TIME-REFERENCE SCANNING-BEAM MICROWAVE LANDING SYSTEM (TRSB MLS) WHICH IS A SYSTEM APPROACH TO THE LANDING-GUIDANCE PROBLEM. IT CAN MEET A WIDE VARIETY OF DIVERSE-PERFORMANCE, ECONOMIC, AND SAFETY REQUIREMENTS AND STILL SUPPLY A UNIVERSAL AIRBORNE RECEIVER-PROCESSOR ABLE TO OPERATE WITH ALL GROUND SYSTEMS. MLS CAN ACHIEVE THESE OBJECTIVES BECAUSE OF TWO MAJOR FACTORS: THE CHOICE OF AN OPERATING FREQUENCY IN THE MICROWAVE C-BAND (5 GHZ), AND THE DESIGN OF ITS SIGNAL FORMAT
Descriptors: AIRCRAFT; GROUND SUPPORT SYSTEMS; MICROWAVE LINKS; AIR-TRAFFIC CONTROL; RADIONAVIGATION
Identifiers: MICROWAVE LANDING SYSTEM, C-BAND; 5 GHZ; TIME REFERENCE SCANNING BEAM SYSTEM; LANDING GUIDANCE; AIRCRAFT COMMUNICATION; GROUND SUPPORT SYSTEM; AIR TRAFFIC CONTROL
Section Class Codes: B7650C, B6330

155967 B79002397, C79001266
SYSTEM REQUIREMENTS FOR TRANSITION FROM ENROUTE TO APPROACH GUIDANCE
MEYER, D.H.
COLLINS RADIO GROUP, ROCKWELL INTERNAT., CEDAR RAPIDS, IA, USA
NAVIGATION (USA) VOL.24, NO.4 312-28 WINTER 1978
Coden: NAVIB3
Treatment: APPLIC-
JOURNAL PAPER-
THE AIRBORNE SYSTEM OPERATIONAL/FUNCTIONAL REQUIREMENTS ARE EXAMINED FOR THE TRANSITIONAL PHASE OF AN AIRCRAFT FLIGHT. THE AUTOMATED NAVIGATION SYSTEM (BASED NOMINALLY ON ENROUTE AIDS) AND THE ILS/MLS SYSTEM CAPABILITIES ARE DESCRIBED, AND THE COMPLEMENTARY NATURE OF EACH IS TREATED. TO ACHIEVE THE FULL POTENTIAL BENEFITS OF PROPOSED LANDING SYSTEM OPERATIONS, IT IS SUGGESTED THAT ON-BOARD ENROUTE NAVIGATION SYSTEMS WILL BE AN IMPORTANT AID TO EXPLOIT FULLY THE RESULTING OPERATIONAL CAPABILITIES. PROPOSED MICROWAVE LANDING SYSTEM CAPABILITIES SUGGEST NEW OPERATIONAL PROCEDURES FOR PREDEFINED MANEUVERS IN THE TERMINAL AREA SUCH AS CLOSE-IN CAPTURES AND COMPLEX APPROACH PATHS. EQUIPMENT CONFIGURATIONS ARE PRESENTED TO DEMONSTRATE THE SYSTEM REQUIREMENTS (12 Refs)
Descriptors: AIR-TRAFFIC CONTROL; RADIONAVIGATION
Identifiers: TRANSITION FROM ENROUTE TO APPROACH GUIDANCE; FUNCTIONAL REQUIREMENTS; AIRCRAFT FLIGHT; AUTOMATED NAVIGATION SYSTEM; ILS/MLS SYSTEM; OPERATIONAL PROCEDURES
Section Class Codes: B7650C, B6330, C3360L, C3370H

155957 B79002396, C79001255
USE OF THE US INTERIM STANDARD MICROWAVE LANDING SYSTEM IN CANADA
REED, W.C.
CAN. AERONAUT. AND SPACE J. (CANADA) VOL.24, NO.4 217-27 JULY-AUG. 1978 Coden: CSPJAE
Treatment: APPLIC-PRACTICAL APPLIC-
JOURNAL PAPER-
DISCUSSES THE TULL AVIATION CORP MICROWAVE LANDING SYSTEM AND ITS APPLICATION AS AN INTERIM STANDARD LANDING SYSTEM IN CANADA
Descriptors: AIR-TRAFFIC CONTROL; RADIONAVIGATION
Identifiers: US INTERIM STANDARD; MICROWAVE LANDING SYSTEM; CANADA; TULL AVIATION CORP
Section Class Codes: B7650C, B6330, C3360L

154188 B79002400, C78030273
DME-BASED SYSTEM FOR ENROUTE/TERMINAL NAVIGATION, ALL-WEATHER LANDING AND AIR TRAFFIC CONTROL
ECKERT, K.D.
STANDARD ELEKTRIK LORENZ AG, STUTTGART, GERMANY
AGARD
AGARD CONFERENCE PROCEEDINGS, NO.240 GUIDANCE AND CONTROL DESIGN CONSIDERATIONS FOR LOW-ALTITUDE AND TERMINAL-AREA FLIGHT 22/1-13 1978
17-20 OCT 1977 DAYTON, OH, USA
Publ AGARD NEUILLY-SUR-SEINE, FRANCE
XIII+308
Treatment: PRACTICAL APPLIC-
REPORT SECTION-
EXPLAINS THE SYSTEMATIC AND TECHNICAL BACKGROUND OF THIS AERONAVIGATIONAL SYSTEM. AN ANALYSIS OF THE VARIOUS SUBSYSTEMS DETAILING THE ADVANTAGES COMPARED TO TODAY'S INSTALLATIONS WHICH DEAL MAINLY WITH THE AREAS OF OPERATIONAL PERFORMANCE AND ECONOMIC EFFICIENCY. IS GIVEN THE INTEGRATED AERONAUTICAL SYSTEM, DESIGNED ON THE BASIS OF THE STANDARDIZED DME-SYSTEM, IS THE ANSWER TO THE CHALLENGE OF ICAOS 7TH AIR NAVIGATION CONFERENCE, WHICH INITIATING THE INTERNATIONAL MLS COMPETITION ASKED FOR 'A TOTAL SYSTEM PLANNING APPROACH WITH DUE REGARD TO OPERATIONAL NEEDS, TECHNICAL FEASIBILITY AND COST EFFECTIVENESS'
Descriptors: RADIONAVIGATION; AIR-TRAFFIC CONTROL; AIRCRAFT; GROUND SUPPORT SYSTEMS
Identifiers: ENROUTE/TERMINAL NAVIGATION; AIR TRAFFIC CONTROL; DME BASED SYSTEM; DISTANCE MEASURING EQUIPMENT; ALL WEATHER LANDING
Section Class Codes: B7650C, B6330, C3360L

154187 B79002399, C78030272
PROPAGATION INTEGRITY FOR MICROWAVE INSTRUMENT LANDING SYSTEMS
DEMKO, P.S.
US ARMY AVIONICS RES. AND DEV. ACTIVITY, FORT MONMOUTH, NJ, USA
AGARD
AGARD CONFERENCE PROCEEDINGS, NO.240. GUIDANCE AND CONTROL DESIGN CONSIDERATIONS FOR LOW-ALTITUDE AND TERMINAL-AREA FLIGHT 21/1-8 1978
17-20 OCT. 1977 DAYTON, OH, USA
Publ: AGARD NEUILLY-SUR-SEINE, FRANCE
XIII+308
Treatment: EXPERIMENTAL-
REPORT SECTION-
TESTING AT AIRFIELDS AT MICROWAVE LANDING SYSTEM FREQUENCIES, USING TYPICAL REALISTIC MULTIPATH GEOMETRIES AND PROTO-TYPICAL MICROWAVE LANDING SYSTEM ANTENNA RADIATION PATTERNS, HAS INDICATED THE EXISTENCE OF A MULTIPATH PROBLEM THAT MUST BE RECKONED WITH IF THE NEXT GENERATION MICROWAVE LANDING SYSTEM, WHATEVER IT MAY BE, IS TO PROVIDE THE UTMOST IN OPERATIONAL UTILITY AND SAFETY. THERE IS STRONG EVIDENCE TO SUPPORT A CONTENTION THAT THE CHOICE OF THE CORRECT POLARISATION IS FUNDAMENTALLY THE SUREST WAY TO RELIEVE THE NEXT GENERATION PRECISION APPROACH AND LANDING SYSTEMS FROM THE BURDEN OF UNNECESSARY MULTIPATH SIGNALS. THE DATA WEIGH HEAVILY IN FAVOR OF CIRCULAR POLARISATION (13 Refs)
Descriptors: AIRCRAFT INSTRUMENTATION; RADIONAVIGATION; GROUND SUPPORT SYSTEMS; AIR-TRAFFIC CONTROL
Identifiers: MICROWAVE INSTRUMENT LANDING SYSTEMS; MULTIPATH PROBLEM; CIRCULAR POLARISATION; PROPAGATION INTEGRITY
Section Class Codes: B7650C, B6330, C3360L

154186 B79002398, C78030270
AUTOMATIC FLIGHT PERFORMANCE OF A TRANSPORT AIRPLANE ON COMPLEX MICROWAVE LANDING SYSTEM PATHS
WALSH, T.M.; WEENER, E.F.
NASA LANGLEY RES. CENTER, HAMPTON, VA, USA
AGARD
AGARD CONFERENCE PROCEEDINGS, NO.240. GUIDANCE AND CONTROL DESIGN CONSIDERATIONS FOR LOW-ALTITUDE AND TERMINAL-AREA FLIGHT 19/1-12 1978
17-20 OCT. 1977 DAYTON, OH, USA
Publ: AGARD NEUILLY-SUR-SEINE, FRANCE
XIII+308
Treatment: PRACTICAL APPLIC-
REPORT SECTION-
BRIEFLY DESCRIBES THE US MICROWAVE LANDING SYSTEM (MLS) AND THE TCV B-737 AIRPLANE USED IN THE DEMONSTRATION FLIGHTS, FOLLOWED BY A DESCRIPTION OF THE DEMONSTRATION SCENARIO AND APPROACH PATHS. THE TRACKING PERFORMANCE ACHIEVED ON THESE PATHS UNDER MLS GUIDANCE IS EXAMINED IN SOME DETAIL. FINALLY, THE WIND ENVIRONMENT, WITHIN WHICH THESE FLIGHTS WERE CONDUCTED, IS QUANTIFIED (4 Refs)
Descriptors: AEROSPACE CONTROL; AIRCRAFT, TRACKING; RADIONAVIGATION, GROUND SUPPORT SYSTEMS
Identifiers: TRANSPORT AIRPLANE; MICROWAVE LANDING SYSTEM; TCV B-737 AIRPLANE; TRACKING; WIND ENVIRONMENT; AUTOMATIC FLIGHT
Section Class Codes: B7650C, B6330, C3360L

153787 B79001879, C78030266
STEEP GRADIENT APPROACH SYSTEMS RESEARCH FOR ALL-WEATHER OPERATIONS
BROWN, A.D.
OPERATIONAL SYSTEMS DIV., ROYAL AIRCRAFT ESTABL., BEDFORD, ENGLAND
AGARD
AGARD CONFERENCE PROCEEDINGS, NO.240. GUIDANCE AND CONTROL DESIGN CONSIDERATIONS FOR LOW-ALTITUDE AND TERMINAL AREA FLIGHT 15/1-15 1978
17-20 OCT. 1977 DAYTON, OH, USA
Publ: AGARD NEUILLY-SUR-SEINE, FRANCE
XIII+308
Treatment: PRACTICAL APPLIC-
REPORT SECTION-
DESCRIBES SOME ASPECTS OF STEEP GRADIENT APPROACH RESEARCH CARRIED OUT AT RAE BEDFORD BETWEEN 1973 AND 1975 USING FLIGHT TRIALS, PILOTED SIMULATION AND THEORETICAL STUDIES. BECAUSE ONLY CONVENTIONAL AIRCRAFT WERE AVAILABLE, THE FLIGHT PROGRAMME WAS ORIENTATED TOWARDS ESTABLISHING THE LIMITATIONS OF SUCH TYPES AND THEIR ASSOCIATED AVIONICS EQUIPMENT WHEN USED FOR R/STOL OPERATIONS. ONLY PERFORMANCE DATA FOR THE TWIN TURBOJET BAC 1-11 AND THE TWIN TURBOPROP HS 748 ARE PRESENTED. ASPECTS CONSIDERED INCLUDE THE DETERMINATION OF THE MAXIMUM USEABLE GLIDESLOPE ANGLE AND THE OPTIMUM BEAMWIDTHS FOR AZIMUTH AND ELEVATION RADIO GUIDANCE TO PERMIT R/STOL OPERATIONS USING A STANDARD AUTOPILOT. IT IS SUGGESTED THAT MLS WITH DME RANGE INFORMATION WILL OVERCOME SOME OF THE LIMITATIONS IDENTIFIED (15 Refs)
Descriptors: AIRCRAFT; AEROSPACE CONTROL; RADIONAVIGATION; AEROSPACE SIMULATION
Identifiers: STEEP GRADIENT APPROACH; AIRCRAFT; R/STOL OPERATIONS; TWIN TURBOJET BAC 1-11; TWIN TURBOPROP HS 748; RADIO GUIDANCE; AUTOPILOT
Section Class Codes: B6330, B7620, C3360L

132118 B78047876
A SCANNING-BEAM MICROWAVE LANDING SYSTEM INCORPORATING DOPPLER CODING
GLASGOW, J.A.
GEC J. SCI. AND TECHNOL. (GB) VOL.44, NO.2 87-92 1978
Coden: GJSTA6
Treatment: APPLIC-
JOURNAL PAPER-
A NEW LANDING GUIDANCE SYSTEM FOR AIRCRAFT IS REQUIRED TO REPLACE THE PRESENT-DAY INSTRUMENT LANDING SYSTEM, WHICH PROVIDES GUIDANCE FOR ONLY A SINGLE LINE OF APPROACH TO THE RUNWAY. WITH THE NEW MICROWAVE LANDING SYSTEM (MLS) THE APPROACH PATH CAN BE SUITED BOTH TO PARTICULAR AIRCRAFT AND TO THE CURRENT TRAFFIC. A NUMER OF ALTERNATIVE TECHNIQUES HAVE BEEN PROPOSED. THE TWO MAIN CONTENDERS BEING THE TIME-REFERENCED SCANNING BEAM (TRSB) AND THE DOPPLER SYSTEM. THIS PAPER DESCRIBES A TECHNIQUE FOR FORMING A TRSB SYSTEM THAT HAS EXCEPTIONAL PRECISION WITH REGARD TO POSITION AND TIME, WHILE ACCURATE FREQUENCY CODING MAY BE APPLIED TO IT AS A MODULATION, SO THAT IT MAY BE INTERPRETED BY A FORM OF DOPPLER PROCESSOR (4 Refs)
Descriptors: GROUND SUPPORT SYSTEMS; AIR-TRAFFIC CONTROL; DOPPLER EFFECT; ENCODING; RADIO DIRECTION-FINDING
Identifiers: LANDING GUIDANCE SYSTEM; MICROWAVE LANDING SYSTEM; PRECISION; FREQUENCY CODING; DOPPLER PROCESSOR; TIME REFERENCED SCANNING BEAM
Section Class Codes: B7650C, B6330

132088 B78047827, C78024832
COMPARISON STUDY OF MLS AIRBORNE SIGNAL PROCESSING TECHNIQUES
KELLY, R.J.; LABERGE, E.F.C.
COMMUNICATIONS DIV., BENDIX CORP., BALTIMORE, MD, USA
IEEE, AMERICAN INST. AERONAUTICS AND ASTRONAUTICS
PROCEEDINGS OF THE IEEE 1978 NATIONAL AEROSPACE AND ELECTRONICS CONFERENCE NAECON 78 502-10 1978
I+16-18 MAY 1978 DAYTON, OH, USA
Publ: IEEE NEW YORK, USA
XLIV+510
Treatment: THEORETICAL-
REPORT SECTION-
EARLY IN THE PROTOTYPE HARDWARE PHASE OF THE US PROGRAM FOR TIME REFERENCE SCANNING BEAM (TRSB) MICROWAVE LANDING SYSTEM (MLS), THE DWELL GATE PROCESSOR WHICH OPERATES ON THE RECEIVED BEAM ENVELOPE WAS SELECTED BECAUSE OF ITS SIMPLICITY. THE STUDY DISCUSSED IN THIS PAPER WAS UNDERTAKEN TO REVIEW THIS DECISION IN THE LIGHT OF WORK THAT HAS BEEN DONE ON OTHER PROCESSOR MECHANIZATIONS IN THE INTERIM. IN COMMON WITH THE DWELL GATE PROCESSOR, THESE PROCESSORS ALSO OPERATE ON THE BEAM ENVELOPE AND IGNORE PHASE INFORMATION. THEREFORE, THE STUDY INCLUDED THE DEFINITION OF AN 'OPTIMUM PHASE AND AMPLITUDE PROCESSOR' AGAINST WHICH ALL OF THE TECHNIQUES WERE COMPARED SO THAT THE SIMPLIFYING TRADEOFF FOR AMPLITUDE ONLY PROCESSING COULD BE PLACED IN AN OPERATIONAL CONTEXT (9 Refs)
Descriptors: SIGNAL PROCESSING; AIRCRAFT INSTRUMENTATION
Identifiers: AIRBORNE SIGNAL PROCESSING TECHNIQUES; MICROWAVE LANDING SYSTEM; TIME REFERENCE SCANNING BEAM; DWELL GATE PROCESSOR
Section Class Codes: B7630, C3360L

121540 B78044245, C78024804
DOPPLER MLS THE UK SOLUTION
FORD, T.
AIRCR. ENG. (GB) VOL.50, NO.2 4-7 FEB. 1978 Coden: AIENAF
Treatment: PRACTICAL APPLIC-
JOURNAL PAPER-
THE NEED TO PROVIDE PRECISION APPROACH GUIDANCE OVER WIDER ANGULAR COVERAGE THAN IS POSSIBLE WITH THE PRESENT INSTRUMENT LANDING SYSTEM (ILS) AND THE WISH TO AVOID SITING PROBLEMS SOMETIMES ENCOUNTERED WITH THE CURRENT EQUIPMENT HAS PROMPTED WORK ON NEW SYSTEMS IN VARIOUS COUNTRIES. IN THE DOPPLER MICROWAVE LANDING SYSTEM, A SOURCE OF RADIATION IS MOVED AT A CONSTANT VELOCITY ALONG THE GROUND AND COMPARED WITH A STATIONARY FREQUENCY IN AN AIRBORNE RECEIVER. THE FREQUENCY DIFFERENCE REPRESENTS A DIRECT MEASURE OF THE ANGLE OF THE RECEIVER FROM THE ARRAY BORESIGHT
Descriptors: RADIONAVIGATION; AIRCRAFT INSTRUMENTATION; AIR-TRAFFIC CONTROL
Identifiers: DOPPLER MLS; AIR TRAFFIC CONTROL; AIRCRAFT; RADIONAVIGATION
Section Class Codes: B7650C, B6330, C3360L

119744 B78043581, C78022687
A NEW L-BAND MLS/DME WITH HIGH ACCURACY
KIRNER, E.O.
AVIONICS DIV., BENDIX CORP., LAUDERDALE, FL, USA
IEEE
PROCEEDINGS OF SOUTHEASTCON '78 REGION 3 CONFERENCE 121-3 1978
10-12 APRIL 1978 ATLANTA, GA, USA
Publ: IEEE NEW YORK, USA
XVIII+556
Treatment: PRACTICAL APPLIC-
REPORT SECTION-
DESCRIBES THE SOLID STATE AIRBORNE AND GROUND DISTANCE MEASURING EQUIPMENT (DME) DESIGNED FOR HIGH ACCURACY MICROWAVE LANDING SYSTEM (MLS) REQUIREMENTS. MODERN LSI TECHNOLOGY AND MICROPROCESSORS ARE USED FOR FILTERING AND PROCESSING THE DIGITAL DATA. IN ADDITION TO RANGE AND RANGE RATE, TERRAIN INDEPENDENT HEIGHT ABOVE THE RUNWAY IS COMPUTED FROM DISTANCE AND MLS ELEVATION AND DISPLAYED IN THE COCKPIT (3 Refs)
Descriptors: DISTANCE MEASUREMENT; AIRCRAFT INSTRUMENTATION; MICROWAVE LINKS; RADIONAVIGATION; AIR-TRAFFIC CONTROL
Identifiers: LSI TECHNOLOGY; MICROPROCESSORS; FILTERING; DIGITAL DATA; RANGE RATE; TERRAIN INDEPENDENT HEIGHT; MICROWAVE LANDING SYSTEM; L-BAND DISTANCE MEASURING EQUIPMENT
Section Class Codes: B6330, B7320C, B7630, B7650C, C3360L

108571 B78040409, C78019845
A HYBRID GUIDANCE SYSTEM FOR ALL-WEATHER APPROACH AND LANDING
HURRASS, K.
DEUTSCHE FORSCHUNGS- UND VERSUCHSANSTALT FUR LUFT- UND RAUMFAHRT E.V., INST. FUR FLUGFUHRUNG, BRAUNSCHWEIG, GERMANY
AGARD
AGARD CONFERENCE PROCEEDINGS NO.220 ON APPLICATIONS OF ADVANCES IN NAVIGATION TO GUIDANCE AND CONTROL 21/1-5 1978
10-13 MAY 1977 STUTTGART, GERMANY
Publ: AGARD NEUILLY-SUR-SEINE, FRANCE
V+288
Treatment: APPLIC-EXPERIMENTAL-
REPORT SECTION-
THE AUTHOR REPORTS TESTS ON THE MICROWAVE LANDING SYSTEM DLS TO FIND OUT TO WHAT DEGREE ITS ACCURACY COULD BE IMPROVED BY INTEGRATING AN INERTIAL NAVIGATION SYSTEM. BOTH SYSTEMS WERE COMBINED BY MEANS OF A KALMAN FILTER. IN THIS STUDY, THE OPERATION OF THE FILTER DURING AN APPROACH IS DESCRIBED. THE ERRORS OF THE TRIAL SYSTEM SET UP AT BRAUNSCHWEIG AIRPORT COULD BE REDUCED TO ABOUT 20PERCENT (5 Refs)
Descriptors: INERTIAL NAVIGATION; RADIONAVIGATION; GROUND SUPPORT SYSTEMS; AIRPORTS; KALMAN FILTERS
Identifiers: HYBRID GUIDANCE SYSTEM; ACCURACY; INERTIAL NAVIGATION SYSTEM; KALMAN FILTER; ERRORS; AIRPORT; ALL WEATHER APPROACH; MICROWAVE LANDING SYSTEM
Section Class Codes: B7650, B6330, B6140, C3360L, C3370H, C1260

108570 B78040408, C78019840
ACCURACY CONSIDERATIONS ON NEW MICROWAVE LANDING SYSTEMS (MLS) FROM AN OPERATIONAL POINT OF VIEW
BECKER, A.
DEUTSCHE FORSCHUNGS- UND VERSUCHSANSTALT FUR LUFT- UND RAUMFAHRT E.V., INST. FUR FLUGFUHRUNG, BRAUNSCHWEIG, FLUGHAFEN, GERMANY
AGARD
AGARD CONFERENCE PROCEEDINGS NO.220 ON APPLICATIONS OF ADVANCES IN NAVIGATION TO GUIDANCE AND CONTROL 10/1-15 1978
10-13 MAY 1977 STUTTGART, GERMANY
Publ: AGARD NEUILLY-SUR-SEINE, FRANCE
V+288
Treatment: APPLIC-
REPORT SECTION-
THE ICAO ACCURACY REQUIREMENTS ON THE NEW MLS ARE FOLLOWED BY A SHORT DESCRIPTION OF THE COMPETING SYSTEMS. THE ACCURACY AND THE COVERAGE ARE DISCUSSED IN THE NEXT CHAPTER, FOLLOWED BY A SHORT DISCUSSION OF THE FLARE GUIDANCE PROBLEM. SOME PROSPECTIVE CONSIDERATIONS ON GROWTH POTENTIAL GIVE AN INDICATION OF POSSIBLE FUTURE PERFORMANCE IMPROVEMENTS (5 Refs)
Descriptors: AIRPORTS; GROUND SUPPORT SYSTEMS; MICROWAVE MEASUREMENT; DISTANCE MEASUREMENT
Identifiers: MICROWAVE LANDING SYSTEMS; ICAO ACCURACY REQUIREMENTS, COVERAGE; FLARE GUIDANCE, GROWTH POTENTIAL; PERFORMANCE IMPROVEMENTS
Section Class Codes: B7650, B7310N, B7320C, C3360L, C3370H, C1120C

107632 B78039079
FLIGHT TEST EVALUATION OF MICROWAVE LANDING SYSTEM AIRBORNE ANTENNAS
GILREATH, M.C.; WHITE, W.F.
LANGLEY RES. CENTER, NASA, HAMPTON, VA, USA
IEEE
1978 INTERNATIONAL SYMPOSIUM DIGEST ANTENNAS AND PROPAGATION 400-3 1978
15-19 MAY 1978 WASHINGTON, DC, USA
Publ: IEEE NEW YORK, USA
XVI+457
Treatment: GENERAL,REVIEW-EXPERIMENTAL-
REPORT SECTION-
PRESENTS THE DATA OBTAINED DURING THE FLIGHT EXPERIMENT WHICH INDICATE THE ACCURACIES OF THE SCALE MODEL MEASUREMENTS AND NUMERICAL RESULTS (6 Refs)
Descriptors: AIRCRAFT INSTRUMENTATION; MICROWAVE ANTENNAS; TESTING
Identifiers: MICROWAVE LANDING SYSTEM; AIRBORNE ANTENNAS; MICROWAVE ANTENNA; FLIGHT TEST DAT
Section Class Codes: B5270B, B7630

095834 B78035871
MICROWAVE LANDING SYSTEMS
POGUST, F.
IEEE SPECTRUM (USA) VOL.15, NO.3 30-6 MARCH 1978
Coden: IEESAM
Treatment: GENERAL,REVIEW-
JOURNAL PAPER-
THE AUTHOR DISCUSSES VARIOUS AIRCRAFT LANDING SYSTEMS INCLUDING THE TIME REFERENCE SCANNING BEAM (TRSB) AND THE DOPPLER MLS
Descriptors: AIRCRAFT INSTRUMENTATION; AIR-TRAFFIC CONTROL; RADIONAVIGATION
Identifiers: MICROWAVE AIRCRAFT LANDING SYSTEMS; TIME REFERENCE SCANNING BEAM SYSTEM; CURVED PATHS; DOPPLER SYSTEM
Section Class Codes: B7630, B7650C, B6330

094628 B78034341
MAINTENANCE MONITORING SYSTEM FOR MICROWAVE LANDING SYSTEM ARRAY ANTENNAS
HSIAO, J.K.; SHELTON, J.P.
RADAR DIV., NAVAL RES. LAB., WASHINGTON, DC, USA
IEEE
1978 INTERNATIONAL SYMPOSIUM DIGEST. ANTENNAS AND PROPAGATION 182-5 1978
15-19 MAY 1978 WASHINGTON, DC, USA
Publ: IEEE NEW YORK, USA
XVI+457
Treatment: APPLIC-PRACTICAL APPLIC-
REPORT SECTION-
DESCRIBES THE DESIGN AND PREDICTED PERFORMANCE OF AN INTEGRAL RF FAULT-ISOLATION MONITORING TECHNIQUE WHICH WILL INDICATE AND LOCALIZE ANY RF OUT-OF-TOLERANCE CONDITION IN THE PHASED ARRAY. THREE METHODS TO ACHIEVE SUCH ARRAY MONITORING ARE DESCRIBED. IN THESE METHODS, MONITORING SAMPLES ARE TAKEN DIRECTLY FROM THE RADIATING ELEMENTS. THEY HENCE DETECT ALL POSSIBLE FAILURES WHICH MIGHT DEVELOP ALONG THE FEED PATH TO THE RADIATING ELEMENTS
Descriptors: RADIONAVIGATION; AIR-TRAFFIC CONTROL; MONITORING; MAINTENANCE ENGINEERING; MICROWAVE ANTENNA ARRAYS
Identifiers: MICROWAVE LANDING SYSTEM; ARRAY ANTENNAS; DESIGN; MAINTENANCE MONITORING SYSTEM; RF FAULT ISOLATION
Section Class Codes: B5270D, B7650C, B6330, B0160

083146 B78031108, C7801416O
RELIABILITY CONSIDERATIONS IN NEW MICROWAVE LANDING SYSTEMS
LESLIE, M.E.; BELCHER, W.R.
AWA TECH. REV. (AUSTRALIA) VOL.16, NO.2 59-63 SEPT 1977 Coden: AWARA3
Treatment: APPLIC-PRACTICAL APPLIC
JOURNAL PAPER-
THE INTERSCAN SYSTEM DEVELOPED AROUND THE TIME REFERENCE SCANNING BEAM (TRSB) CONCEPT, IS PROPOSED BY AUSTRALIA FOR INTERNATIONAL ADOPTION. THE RELIABILITY PARAMETERS ARE SUMMARISED. ALSO OPERATIONAL CONSIDERATIONS AND DESIGN FACTORS INFLUENCING THE DEFINITION OF AN ENGINEERING SOLUTION TO THE NEW REQUIREMENTS. SOME OF THE INEVITABLE DESIGN CONFLICTS WHICH REQUIRE RESOLUTION ARE NOTED. PARTICULAR ATTENTION IS PAID TO THOSE ASPECTS WHICH DISTINGUISH THE SYSTEM FROM OTHERS IN WHICH RELIABILITY HAS FUNDAMENTAL SIGNIFICANCE. CLEARLY, THIS VIEWPOINT DOES NOT PROVIDE THE SOLE BASIS FOR EXAMINING THE SYSTEM RELIABILITY. THE EMPHASIS REFLECTS THE AUTHORS' ASSOCIATION WITH EQUIPMENT DESIGN AND MANUFACTURE. CONSEQUENTLY, THE PERSONAL VIEWS EXPRESSED ON ISSUES STILL REQUIRING INTERNATIONAL CONSENSUS SHOULD NOT BE IDENTIFIED WITH THE ASSESSMENT OF INDIVIDUAL OPERATING AUTHORITIES IN AUSTRALIA OR OVERSEAS (11 Refs)
Descriptors: AIR-TRAFFIC CONTROL; RADIO DIRECTION-FINDING; RELIABILITY
Identifiers: MICROWAVE LANDING SYSTEMS; INTERSCAN SYSTEM RELIABILITY; AIR TRAFFIC CONTROL; RADIO DIRECTION FINDING
Section Class Codes: B7650C, B6330, C3360L, C3370H

083147 B78031109
FUTURE AIRCRAFT LANDING SYSTEM' TRSB, DMLS OR DLS?
NACHR. ELEKTRON. (GERMANY) VOL.32, NO.3 96 MARCH 1978 Coden: NAELDV
Treatment: GENERAL.REVIEW-
JOURNAL PAPER-
Languages: GERMAN
FOR SOME TIME THE INTERNATIONAL CIVIL AVIATION ORGANISATION HAS BEEN IN THE PROCESS OF SELECTING A MICROWAVE LANDING SYSTEM, WHICH WILL REPLACE THE PRESENT INSTRUMENT LANDING SYSTEM. THE NEW SYSTEM WILL ALLOW A MORE FLEXIBLE FINAL APPROACH FOR LANDING AIRCRAFT. THREE SYSTEMS HAVE BEEN DEVELOPED' TIME REFERENCE SCANNING BEAM, DOPPLER MICROWAVE LANDING SYSTEM AND DME-CONTROLLED LANDING SYSTEM. THE LAST ONE, DEVELOPED BY SEL, HAS THE GREAT ADVANTAGE THAT THE PRESENT AIRBORNE EQUIPMENT MAY BE USED FOR THE NEW FUNCTION WITH AN ADD-ON-MODULE, AND NO ADDITIONAL SET OF ELECTRONICS WILL BE NECESSARY
Descriptors: AIRCRAFT INSTRUMENTATION; RADIONAVIGATION; AIR-TRAFFIC CONTROL
Identifiers: TIME REFERENCE SCANNING BEAM; DOPPLER MICROWAVE LANDING SYSTEM; DME-CONTROLLED LANDING SYSTEM; MICROWAVE LANDING SYSTEMS; LANDING SYSTEM SELECTION; OPERATION
Section Class Codes: B7650C, B6330

083137 B78031098
RADIO LANDING SYSTEMS. BACKGROUND TO RADIO BLIND LANDING AIDS AND THE CHOICE OF I.L.S. REPLACEMENT
DARRINGTON, P.R.
WIRELESS WORLD (GB) VOL.84, NO.1508 38-43, 56 APRIL 1978 Coden: WIWOAA
Treatment: PRACTICAL APPLIC-
JOURNAL PAPER-
THE INTERNATIONAL CIVIL AVIATION ORGANISATION (ICAO) IS DUE TO MAKE A DECISION ABOUT THE CHOICE OF MICROWAVE LANDING SYSTEM FOR THE FUTURE. THIS PAPER DISCUSSES THE HISTORY OF LANDING SYSTEMS AND THE PRESENT TECHNICAL BATTLE BETWEEN THE US AND UK AVIATION ORGANISATIONS FOR THE MICROWAVE SYSTEM (8 Refs)
Descriptors: AIR TRAFFIC CONTROL; RADIO APPLICATIONS
Identifiers: RADIO BLIND LANDING AIDS; MICROWAVE LANDING SYSTEM
Section Class Codes: B7630, B7650C

071463 B78026249, C7801418I
GUIDANCE ACCURACY CONSIDERATION FOR THE MICROWAVE LANDING SYSTEM
KELLY, R.J.
NAVIGATION (USA) VOL.24, NO.3 189-205 FALL 1977
Coden: NAVI83
Treatment: PRACTICAL APPLIC-
JOURNAL PAPER-
AN MLS (MICROWAVE LANDING SYSTEM) SPECIFICATION IS PROPOSED WHICH INVOLVES ONLY TWO DEFINITIONS-THE 'PATH FOLLOWING ERROR' AND THE 'CONTROL MOTION NOISE'. THE SPECIFICATION IS SIMPLE AND ECONOMICAL BECAUSE THE TRADITIONAL BIAS COMPONENT DOES NOT REQUIRE A SEPARATE MEASUREMENT. ADDITIONAL STUDIES ARE REQUIRED TO ENSURE THAT THE CONCEPT IS CONSISTENT WITH ACCEPTABLE AIRCRAFT ATTITUDE LIMITS. IT IS RECOMMENDED THAT MLS GROUND EQUIPMENT BE SPECIFIED SO AS TO GENERATE AN MLS SIGNAL-IN-SPACE HAVING CATEGORY III ACCURACY PERFORMANCE AT ALL GOVERNMENT MAINTAINED RUNWAYS (19 Refs)
Descriptors: GROUND SUPPORT SYSTEMS; AIR-TRAFFIC CONTROL; MICROWAVE LINKS; AIRCRAFT COMMUNICATION
Identifiers: MICROWAVE LANDING SYSTEM; PATH FOLLOWING ERROR; CONTROL MOTION NOISE; AIRCRAFT ATTITUDE LIMITS; GUIDANCE ACCURACY; STANDARDS; GROUND SUPPORT SYSTEM
Section Class Codes: B7650C, B6330, C3360L

056343 B78021695
PRECISION DME FOR NEW LANDING SYSTEM' FAST OR SLOW PULSE?
GRAZIANI, D.
FACE-STANDARD, MILAN, ITALY
ELECTR. COMMUN (GB) VOL.52, NO.4 289-92 1977 Coden: ELCMAX
Treatment: PRACTICAL APPLIC-
JOURNAL PAPER-
SOME PROPOSALS HAVE RECENTLY BEEN MADE FOR THE NEW PRECISION DISTANCE MEASURING EQUIPMENT (P-DME) WITH THE OBJECTIVE OF DEVELOPING A SYSTEM THAT IS BOTH COMPATIBLE AS FAR AS IS POSSIBLE, WITH THE EXISTING DME EQUIPMENT AND SUITABLE FOR COLLOCATION WITH THE PROPOSED NEW MICROWAVE LANDING SYSTEM (MLS). THESE PROPOSALS ARE BASED ON TWO DISTINCT TECHNIQUES' FIRST, ADOPTION OF A NEW PULSE THAT IS COMPATIBLE WITH THE EXISTING ONE BUT WITH A SHORTER RISE TIME, THE SO-CALLED FAST PULSE; SECOND, ADOPTION OF THE EXISTING (SLOW) PULSE BUT WITH IMPROVEMENTS IN THE ASSOCIATED CIRCUITS AND NEW TECHNIQUES THAT WILL NOT REQUIRE INTERNATIONAL CIVIL AVIATION ORGANIZATION (ICAO) SPECIFICATIONS. THE MOST CRITICAL POINTS IN COMPARING THESE TECHNIQUES ARE CONSIDERED (6 Refs)
Descriptors: DISTANCE MEASUREMENT; MICROWAVE LINKS; RADIONAVIGATION
Identifiers: SLOW PULSE; PRECISION DISTANCE MEASURING EQUIPMENT; MICROWAVE LANDING SYSTEM; FAST PULSE
Section Class Codes: B7630, B7320C, B6330

018861 B78008095
AIRBORNE NAVIGATION SYSTEM PERFORMANCE DURING RNAV/MLS TRANSITION
HEINE, W.
SYSTEMS CONTROL INC., PALO ALTO, CA, USA
IEEE, ET AL.
PROCEEDINGS OF THE IEEE 1977 NATIONAL AEROSPACE AND ELECTRONICS CONFERENCE, NAECON '77 705-12 1977
17-19 MAY 1977 DAYTON, OHIO, USA
Publ: IEEE NEW YORK, USA
XXXI+1369
Treatment: EXPERIMENTAL~
REPORT SECTION~
AIRCRAFT POSITION ERROR SENSITIVITY TO SENSOR ERRORS AND FLIGHT PATH GEOMETRY IS ANALYZED DURING RNAV/MLS TRANSITION USING A DIGITAL COMPUTER SIMULATION. THE AVIONICS SENSITIVITY DATA PROVIDES INFORMATION NECESSARY TO ESTABLISH REQUIREMENTS FOR ADDITIONAL GUIDANCE LAW DESIGN AND TO ESTABLISH AIRSPACE REQUIREMENTS FOR MANEUVERING TO NULL OUT ANY RESIDUAL RNAV (AREA OF NAVIGATION) ERRORS UPON MLS (MICROWAVE LANDING SYSTEM) TRANSITION. THE DATA BASE IS ALSO BENEFICIAL AS PLANNING INFORMATION FOR SUBSEQUENT FLIGHT TESTING. THE PARAMETERS VARIED DURING THE GENERATION OF THE DATA BASE INCLUDE FLIGHT PROFILE, ERROR SOURCE CONTENT AND MAGNITUDE, GROUND FACILITY LOCATION, RUNWAY/FLIGHT PATH ORIENTATION AND NAVIGATION MODE (10 Refs)
Descriptors: AIRCRAFT INSTRUMENTATION; RADIONAVIGATION
Identifiers: AVIONICS SENSITIVITY DATA; AIRBORNE NAVIGATION SYSTEM; MICROWAVE LANDING SYSTEM, AIRCRAFT
Section Class Codes: B7630, B6330

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